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STRUCTURE FILE UPDATES: 29 NOV 2007 HIGHEST RN 956314-53-7  
DICTIONARY FILE UPDATES: 29 NOV 2007 HIGHEST RN 956314-53-7

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<http://www.cas.org/support/stngen/stndoc/properties.html>

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(FILE 'HOME' ENTERED AT 16:09:32 ON 30 NOV 2007)

FILE 'HCAPLUS' ENTERED AT 16:09:44 ON 30 NOV 2007

L1 1 SEA ABB=ON PLU=ON US2006121352/PN  
SEL RN

FILE 'REGISTRY' ENTERED AT 16:10:10 ON 30 NOV 2007

L2 12 SEA ABB=ON PLU=ON (12057-24-8/BI OR 12190-79-3/BI OR  
12676-27-6/BI OR 26134-62-3/BI OR 34381-44-7/BI OR  
39377-57-6/BI OR 553-91-3/BI OR 554-13-2/BI OR 7439-93-2/  
BI OR 7440-44-0/BI OR 7789-24-4/BI OR 9011-17-0/BI)  
D SCA

L3 1 SEA ABB=ON PLU=ON "LITHIUM CARBONATE"/CN  
D SCA

L4 2 SEA ABB=ON PLU=ON ("LITHIUM SULFITE (LI2SO3)"/CN OR  
"LITHIUM SULFITE (LIHSO3)"/CN)  
D SCA

L5 1 SEA ABB=ON PLU=ON L2 AND SULFUROUS

L6 1 SEA ABB=ON PLU=ON "LITHIUM OXIDE"/CN  
D SCA

L7 1 SEA ABB=ON PLU=ON "LITHIUM NITRIDE"/CN  
D SCA

L8 2 SEA ABB=ON PLU=ON "LITHIUM BORATE"/CN  
D SCA

L9 1 SEA ABB=ON PLU=ON "LITHIUM FLUORIDE"/CN  
D SCA

L10 1 SEA ABB=ON PLU=ON L2 AND C2H2O4.2LI/MF

L11 10 SEA ABB=ON PLU=ON (L3 OR L4 OR L5 OR L6 OR L7 OR L8 OR  
L9 OR L10)

L12 6 SEA ABB=ON PLU=ON L2 AND L11  
 L13 1 SEA ABB=ON PLU=ON L2 AND CO/ELS  
 D SCA  
 L14 9 SEA ABB=ON PLU=ON (LI(L)CO)/ELS (L) 2/ELC.SUB  
 L15 1 SEA ABB=ON PLU=ON 727423-19-0/RN  
 D SCA

FILE 'HCAPLUS' ENTERED AT 16:26:26 ON 30 NOV 2007

L16 QUE ABB=ON PLU=ON POSITIVE?(A)(ACTIVE? OR ELECTROD##)  
 OR CATHOD##  
 L17 QUE ABB=ON PLU=ON (LITHIUM OR LI) (2A) (COMPOUND OR  
 ADDITIVE? OR ADJUVANT? OR AUXILIAR?)  
 L18 48323 SEA ABB=ON PLU=ON L11  
 L19 5217 SEA ABB=ON PLU=ON L16 AND (L17 OR L18)  
 L20 16954 SEA ABB=ON PLU=ON (LI OR LITHIUM OR LITHIAT?) (2A) L16  
 L21 2572 SEA ABB=ON PLU=ON L19 AND L20  
 L22 QUE ABB=ON PLU=ON MIX? OR BLEND? OR ADMIX? OR COMMIX?  
 OR IMMIX? OR INTERMIX? OR COMPOSIT? OR FORMULAT? OR  
 COMBINAT?  
 L23 1359 SEA ABB=ON PLU=ON L21 AND L22  
 L24 657 SEA ABB=ON PLU=ON L23 AND L18  
 L25 8149 SEA ABB=ON PLU=ON L16 (2A) L22  
 L26 148 SEA ABB=ON PLU=ON L24 AND L25  
 L27 QUE ABB=ON PLU=ON (LI OR LITHIUM) (2A) (BATTER? OR CELL)  
 L28 136 SEA ABB=ON PLU=ON L26 AND L27  
 D KWIC  
 L29 2389 SEA ABB=ON PLU=ON L11 (L) MOA/RL  
 L30 13 SEA ABB=ON PLU=ON L28 AND L29  
 L31 795 SEA ABB=ON PLU=ON L11 (L) (ADDITIVE? OR ADJUVANT? OR  
 AUXILIAR? OR MODIF?)  
 L32 8 SEA ABB=ON PLU=ON L28 AND L31  
 L33 18 SEA ABB=ON PLU=ON L30 OR L32  
 L34 9 SEA ABB=ON PLU=ON L33 AND (PY<=2002 OR PRY<=2002 OR  
 AY<=2002)  
 L35 5059 SEA ABB=ON PLU=ON L13  
 L36 2 SEA ABB=ON PLU=ON L15

FILE 'REGISTRY' ENTERED AT 16:40:27 ON 30 NOV 2007

L37 1 SEA ABB=ON PLU=ON L2 AND ?HEXAFLUORO?/CNS

FILE 'HCAPLUS' ENTERED AT 16:42:19 ON 30 NOV 2007

L38 4255 SEA ABB=ON PLU=ON L37  
 L39 292 SEA ABB=ON PLU=ON L13 AND L38  
 L40 QUE ABB=ON PLU=ON PLASTICIZ? OR RHEOLOG?  
 L41 47 SEA ABB=ON PLU=ON L39 AND L40  
 D KWIC 1-2  
 L42 28 SEA ABB=ON PLU=ON L41 AND L16  
 L43 15 SEA ABB=ON PLU=ON L42 AND L22  
 L44 18 SEA ABB=ON PLU=ON (L42 OR L43) AND (C OR CARBON)  
 D KWIC  
 L45 0 SEA ABB=ON PLU=ON L44 AND L15  
 L46 1 SEA ABB=ON PLU=ON L44 AND LI2CO3  
 D KWIC  
 L47 1 SEA ABB=ON PLU=ON L1 OR L46  
 L48 17 SEA ABB=ON PLU=ON L33 NOT L47  
 L49 17 SEA ABB=ON PLU=ON L44 NOT (L47 OR L48)

=> fil hcap

FILE 'HCAPLUS' ENTERED AT 16:51:24 ON 30 NOV 2007

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FILE COVERS 1907 - 30 Nov 2007 VOL 147 ISS 24  
 FILE LAST UPDATED: 29 Nov 2007 (20071129/ED)

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This file contains CAS Registry Numbers for easy and accurate substance identification.

=> d 147 ibib abs hitstr hitind

L47 ANSWER 1 OF 1 HCAPLUS COPYRIGHT 2007 ACS on STN  
 ACCESSION NUMBER: 2004:453546 HCAPLUS Full-text  
 DOCUMENT NUMBER: 141:9634  
 TITLE: Lithium ion battery **cathode compositions** having a lithium compound additive to eliminate irreversible capacity loss  
 INVENTOR(S): Kejha, Joseph B.; Smith, W. Novis  
 PATENT ASSIGNEE(S): USA  
 SOURCE: PCT Int. Appl., 14 pp.  
 CODEN: PIXXD2  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

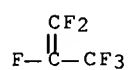
| PATENT NO.   | KIND | DATE     | APPLICATION NO. | DATE     |
|--|------|----------|-----------------|----------|
| WO 2004047202  | A1   | 20040603 | WO 2002-US36878 | 20021118 |
| W: CA, JP, KR, US<br>RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE,<br>IT, LU, MC, NL, PT, SE, SK, TR<br>US 2006121352 A1 20060608 US 2005-534313<br>20050509 |      |          |                 |          |

PRIORITY APPLN. INFO.: <-- WO 2002-US36878 W 20021118

AB The invention concerns **cathode compns.** for use in lithium-ion cells and other metal-ion cells, which have a lithium compound or other metal compound additives, matching the selected chemical of the cell, which additives

eliminate irreversible capacity loss. The additive is selected from Li<sub>2</sub>CO<sub>3</sub>, Li<sub>2</sub>(SO<sub>3</sub>), Li<sub>2</sub>O, Li<sub>3</sub>N, Li borate, Li boride, LiF, and/or Li oxalate.

IT 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer  
 12190-79-3, Cobalt lithium oxide colio2  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (lithium ion battery **cathode compns.** having  
 lithium compound additive to eliminate irreversible capacity loss)  
 RN 9011-17-0 HCAPLUS  
 CN 1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with 1,1-difluoroethene  
 (CA INDEX NAME)  
 CM 1  
 CRN 116-15-4  
 CMF C3 F6



CM 2  
 CRN 75-38-7  
 CMF C2 H2 F2



RN 12190-79-3 HCAPLUS  
 CN Cobalt lithium oxide (CoLiO<sub>2</sub>) (CA INDEX NAME)

| Component | Ratio | Component<br>Registry Number |
|-----------|-------|------------------------------|
| =====     | ===== | =====                        |
| O         | 2     | 17778-80-2                   |
| Co        | 1     | 7440-48-4                    |
| Li        | 1     | 7439-93-2                    |

IC ICM H01M004-62  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST lithium battery **cathode compn** irreversible  
 capacity loss elimination  
 IT Battery **cathodes**  
**Plasticizers**  
 (lithium ion battery **cathode compns.** having  
 lithium compound additive to eliminate irreversible capacity loss)  
 IT Secondary batteries  
 (lithium; lithium ion battery **cathode compns.**  
 having lithium compound additive to eliminate irreversible capacity  
 loss)  
 IT Secondary batteries  
 (metal-ion; lithium ion battery **cathode compns**  
 . having lithium compound additive to eliminate irreversible  
 capacity loss)

IT 7440-44-0, **Carbon**, uses  
RL: DEV (Device component use); USES (Uses)  
(lithium ion battery **cathode compns.** having  
lithium compound additive to eliminate irreversible capacity loss)  
IT 553-91-3, Lithium oxalate 554-13-2, Lithium carbonate  
7439-93-2D, Lithium, compound 7789-24-4, Lithium fluoride, uses  
9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer  
12057-24-8, Lithium oxide, uses 12190-79-3, Cobalt lithium  
oxide colio2 12676-27-6 26134-62-3, Lithium nitride  
34381-44-7, Sulfurous acid, lithium salt 39377-57-6, Lithium  
boride  
RL: MOA (Modifier or additive use); USES (Uses)  
(lithium ion battery **cathode compns.** having  
lithium compound additive to eliminate irreversible capacity loss)  
REFERENCE COUNT: 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR  
THIS RECORD. ALL CITATIONS AVAILABLE IN  
THE RE FORMAT

=> d 148 ibib abs hitstr hitind 1-17

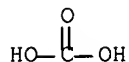
L48 ANSWER 1 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN  
ACCESSION NUMBER: 2007:643347 HCAPLUS Full-text  
DOCUMENT NUMBER: 147:119470  
TITLE: Manufacture of lithium titanate/polyacene  
**composite** for **cathode** of  
rechargeable **lithium battery**  
INVENTOR(S): Wang, Rongshun; Yu, Haiying; Xie, Haiming; Pan,  
Xiumei; Su, Zhongmin  
PATENT ASSIGNEE(S): Northeast Normal University, Peop. Rep. China  
SOURCE: Faming Zhuanli Shenqing Gongkai Shuomingshu,  
12pp.  
CODEN: CNXXEV  
DOCUMENT TYPE: Patent  
LANGUAGE: Chinese  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

| PATENT NO.                              | KIND | DATE     | APPLICATION NO.  | DATE         |
|---|------|----------|------------------|--------------|
| -----                                   | ---- | -----    | -----            |              |
| CN 1978524                              | A    | 20070613 | CN 2006-10131660 | 200611<br>23 |
| PRIORITY APPLN. INFO.: CN 2006-10131660 |      |          |                  | 200611<br>23 |

AB The **composite** is manufactured by the steps of: (1) **mixing** 1 mol phenol and excess formaldehyde with NH<sub>4</sub>OH as catalyst for 4-6 h, neutralizing, reacting for 2-3 h to obtain phenol formaldehyde resin, (2) adding expanding agent to phenol formaldehyde resin, solidifying for 10-24 h, pyrolyzing at 400-1100° under nitrogen, washing, drying, and pulverizing to obtain black polyacene conducting material with metallic luster, (3) **mixing** lithium salts and titanium oxide according to stoichiometric ratio, adding 1-20% polyacene and ball-milling for 3-10 h, and (4) sintering at 400-1100° for 8-24 h. Thus, 1 mol phenol and excess of formaldehyde were reacted in the presence of NH<sub>4</sub>OH for 5 h, neutralized to pH=7, stirred for 2 h to give a phenol-formaldehyde copolymer, added with expanding agent, solidifying 15 h, pyrolyzed at 600° to

give a polyacene, 8% of which was mixed with lithium carbonate and anatase, milled for 3 h, heated at 800° for 12 h to give a title composite.

IT 554-13-2, Lithium carbonate 7789-24-4, Lithium fluoride, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (manufacture of lithium titanate/polyacene composite for cathode of rechargeable lithium battery)  
 )  
 RN 554-13-2 HCAPLUS  
 CN Carbonic acid, lithium salt (1:2) (CA INDEX NAME)



●2 Li

RN 7789-24-4 HCAPLUS  
 CN Lithium fluoride (LiF) (CA INDEX NAME)

F-Li

CC 38-3 (Plastics Fabrication and Uses)  
 Section cross-reference(s): 52  
 ST lithium titanate polyacene cathode rechargeable lithium battery  
 IT Secondary batteries  
 (lithium; manufacture of lithium titanate/polyacene composite for cathode of rechargeable lithium battery)  
 )  
 IT Phenolic resins, uses  
 Polyacenes  
 RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (manufacture of lithium titanate/polyacene composite for cathode of rechargeable lithium battery)  
 )  
 IT Carbon black, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (manufacture of lithium titanate/polyacene composite for cathode of rechargeable lithium battery)  
 )  
 IT 9003-35-4DP, Phenol-formaldehyde copolymer, pyrolyzed  
 RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (manufacture of lithium titanate/polyacene composite for cathode of rechargeable lithium battery)  
 )  
 IT 554-13-2, Lithium carbonate 1310-65-2, Lithium hydroxide 1317-70-0, Anatase 1317-80-2, Rutile 7447-41-8, Lithium chloride, uses 7550-35-8, Lithium bromide 7789-24-4,

Lithium fluoride, uses 10377-51-2, Lithium iodide 10377-52-3,  
Lithium phosphate

RL: MOA (Modifier or additive use); USES (Uses)  
(manufacture of lithium titanate/polyacene composite for  
cathode of rechargeable lithium battery  
)

IT 131959-50-7, Polytetrafluoroethane

RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical  
or engineered material use); USES (Uses)  
(manufacture of lithium titanate/polyacene composite for  
cathode of rechargeable lithium battery  
)

IT 9003-07-0, Polypropylene

RL: TEM (Technical or engineered material use); USES (Uses)  
(manufacture of lithium titanate/polyacene composite for  
cathode of rechargeable lithium battery  
)

L48 ANSWER 2 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2007:545669 HCAPLUS Full-text

DOCUMENT NUMBER: 147:55368

TITLE: Composite dopant modified  
cathode material for secondary  
lithium battery, and its  
manufacture

INVENTOR(S): Zhou, Zhentao; Xie, Hui

PATENT ASSIGNEE(S): South China University of Technology, Peop. Rep.  
China

SOURCE: Faming Zhuanli Shenqing Gongkai Shuomingshu,  
12pp.

CODEN: CNXXEV

DOCUMENT TYPE: Patent

LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

| PATENT NO. | KIND | DATE     | APPLICATION NO.  | DATE         |
|------------|------|----------|------------------|--------------|
| -----      | ---- | -----    | -----            |              |
| CN 1964105 | A    | 20070516 | CN 2006-10123786 | 200611<br>27 |

PRIORITY APPLN. INFO.: CN 2006-10123786

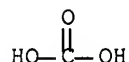
200611  
27

AB The cathode material is obtained by mixing a lithium source compound, a phosphorous source compound, a Fe source compound, and a compound containing a crystalline dopant of rare earth element at a mole ratio of Li:Fe:P:M = 1:(0.97-0.995):1:(0.005-0.03), and a compound containing an amorphous doping element C (such as glucose, epoxy resin or cellobiose) 1-10% based on the total mass of the mixture; heating at 250-400° for 5-20 h; cooling; grinding to obtain a reactive precursor containing PO<sub>4</sub><sup>3-</sup>, Li<sup>+</sup>, Mn<sup>+</sup>, Fe<sup>2+</sup> and carbon black; firing at 500-800° for 10-40 h; and cooling to obtain a LiF e(1-x)MxPO<sub>4</sub>/C composite doped cathode material.

IT 554-13-2, Lithium carbonate

RL: RCT (Reactant); RACT (Reactant or reagent)  
(lithium ion battery pos.  
electrode material modified by  
composite doping, and preparation thereof)

RN 554-13-2 HCAPLUS  
 CN Carbonic acid, lithium salt (1:2) (CA INDEX NAME)



●2 Li

- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST secondary lithium battery cathode  
 manif composite  
 IT Battery cathodes  
 (lithium ion battery pos.  
 electrode material modified by composite  
 doping, and preparation thereof)  
 IT Epoxy resins, processes  
 RL: PEP (Physical, engineering or chemical process); PROC (Process)  
 (lithium ion battery pos.  
 electrode material modified by composite  
 doping, and preparation thereof)  
 IT Secondary batteries  
 (lithium; manufacture of cathode materials for  
 secondary lithium batteries)  
 IT 7440-44-0P, Carbon, uses 15365-14-7P 939775-69-6P, Iron  
 lanthanum lithium phosphate (Fe<sub>0.99</sub>La<sub>0.01</sub>Li(PO<sub>4</sub>)) 939775-71-0P,  
 Iron lithium neodymium phosphate (Fe<sub>0.98</sub>LiNd<sub>0.02</sub>(PO<sub>4</sub>))  
 939775-72-1P, Cerium iron lithium phosphate (Ce<sub>0.03</sub>Fe<sub>0.97</sub>Li(PO<sub>4</sub>))  
 RL: IMF (Industrial manufacture); TEM (Technical or engineered  
 material use); PREP (Preparation); USES (Uses)  
 (lithium ion battery pos.  
 electrode material modified by composite  
 doping, and preparation thereof)  
 IT 528-50-7, Cellobiose 12619-70-4, Cyclodextrin  
 RL: PEP (Physical, engineering or chemical process); PROC (Process)  
 (lithium ion battery pos.  
 electrode material modified by composite  
 doping, and preparation thereof)  
 IT 50-99-7, Glucose, reactions 516-03-0, Ferrous oxalate 537-00-8,  
 Cerium acetate 546-89-4, Lithium acetate 554-13-2,  
 Lithium carbonate 917-70-4, Lanthanum acetate 3094-87-9, Ferrous  
 acetate 6192-13-8, Neodymium acetate 7664-38-2, Phosphoric acid,  
 reactions 7722-76-1, Ammonium dihydrogen phosphate 7783-28-0,  
 Diammonium phosphate 7790-69-4, Lithium nitrate 10124-31-9,  
 Ammonium phosphate 23363-14-6, Yttrium acetate  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (lithium ion battery pos.  
 electrode material modified by  
 composite doping, and preparation thereof)

L48 ANSWER 3 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN  
 ACCESSION NUMBER: 2007:492153 HCAPLUS Full-text  
 DOCUMENT NUMBER: 147:215537  
 TITLE: Study on modification of carbon-doped  
 LiMn<sub>0.6</sub>Fe<sub>0.4</sub>PO<sub>4</sub>  
 AUTHOR(S): Hu, Qin-qin; Zhou, Zhen-tao  
 CORPORATE SOURCE: College of Materials Science and Engineering,



South China University of Technology, Guangzhou,  
Guangdong, 510640, Peop. Rep. China

SOURCE: Dianchi (2007), 37(1), 38-40  
CODEN: DNCHEP; ISSN: 1001-1579

PUBLISHER: Dianchi Zazhishe

DOCUMENT TYPE: Journal

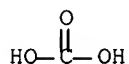
LANGUAGE: Chinese

AB Pure  $\text{LiMn}_0.6\text{Fe}_0.4\text{PO}_4$  and  $\text{LiMn}_0.6\text{Fe}_0.4\text{PO}_4/\text{C}$  **composite cathode** materials for **lithium-ion batteries** were prepared by high-temperature solid-state reaction. The content of carbon, crystal structure, morphol. and elec. performance of the samples were investigated by dissoln. in acid, XRD, SEM and charge-discharge test. The obtained  $\text{LiMn}_0.6\text{Fe}_0.4\text{PO}_4$  and  $\text{LiMn}_0.6\text{Fe}_0.4\text{PO}_4/\text{C}$  had pure olivine-type crystal structure.  $\text{LiMn}_0.6\text{Fe}_0.4\text{PO}_4/\text{C}$  **composite** with sucrose as carbon doping source had fine cycle performance and high rate performance. For the **composite**, initial specific discharge capacity was 122.3 mAh/g, and the capacity retention was 99.3% after 15 cycles when charge-discharge at 0.1 C. The initial discharge specific capacities were 121.4 mAh/g and 110.2 mAh/g when charge-discharge at 0.5 C and 1.5 C, resp.

IT 554-13-2, Lithium carbonate  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(study on **modification** of carbon-doped  $\text{LiMn}_0.6\text{Fe}_0.4\text{PO}_4$ )

RN 554-13-2 HCAPLUS

CN Carbonic acid, lithium salt (1:2) (CA INDEX NAME)



●2 Li

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST carbon doping lithium manganese iron phosphate **cathode**  
elec property

IT Secondary **batteries**  
(**lithium**; study on **modification** of carbon-doped  $\text{LiMn}_0.6\text{Fe}_0.4\text{PO}_4$ )

IT Ball milling  
Calcination  
**Cathodes**  
**Composites**  
Electric charge  
Electric discharge  
Particle size  
Particle size distribution  
Solid state reaction  
Surface structure  
Thermal decomposition  
(study on **modification** of carbon-doped  $\text{LiMn}_0.6\text{Fe}_0.4\text{PO}_4$ )

IT 57-50-1, Sucrose, reactions 516-03-0, Ferrous oxalate  
554-13-2, Lithium carbonate 598-62-9, Manganous carbonate  
7697-37-2, Nitric acid, reactions 7783-28-0, Diammonium hydrogen  
phosphate  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(study on **modification** of carbon-doped  $\text{LiMn}_0.6\text{Fe}_0.4\text{PO}_4$ )

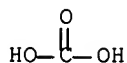
ACCESSION NUMBER: 2006:1359779 HCAPLUS Full-text  
 DOCUMENT NUMBER: 146:125291  
 TITLE: **Cathode plate or anode plate having comprehensive properties for use in rechargeable lithium ion batteries**  
 INVENTOR(S): Dong, Jiaqiong  
 PATENT ASSIGNEE(S): Peop. Rep. China  
 SOURCE: Faming Zhuanli Shenqing Gongkai Shuomingshu, 12pp.  
 CODEN: CNXXEV  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Chinese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

| PATENT NO.             | KIND | DATE     | APPLICATION NO.  | DATE               |
|------------------------|------|----------|------------------|--------------------|
| -----                  | ---- | -----    | -----            |                    |
| CN 1881660             | A    | 20061220 | CN 2006-10087130 | 20060613           |
| PRIORITY APPLN. INFO.: |      |          |                  | CN 2005-20109947 U |
|                        |      |          |                  | 20050617           |

AB The invention includes coating a first layer on the substrate the **mixture** of anode plate active material, adhesive and additives at ratio of (80-90) : (10-4) : (10-6) in weight portion to the thickness of 0.1-300 $\mu$ m. Or, coating a first layer on the substrate the **mixture** of **cathode** plate active material, adhesive and additives at ratio of (70-94) : (10-2) : (20-4) in weight portion to the thickness of 0.1-250 $\mu$ m. The claimed electrode plate has multiple layers of coating, formed by varying **mixture** of different electrode plate active material, adhesive and additives, on the substrate surface. Thus, changes the comprehensive properties of electrode plate, achieves closer integration between layers, enhances adhesion of interfacial particles, improves strip force of coat, ensures electrode plate property and interfacial adhesion, and meets performance requirements for batteries.

IT 554-13-2, Lithium carbonate  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (additives, **cathode** plate or anode plate having comprehensive properties for use in rechargeable lithium ion batteries)

RN 554-13-2 HCAPLUS  
 CN Carbonic acid, lithium salt (1:2) (CA INDEX NAME)



●2 Li

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST **cathode** anode plate **lithium ion battery**  
 IT Carbon fibers, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (additives, **cathode** plate or anode plate having

- comprehensive properties for use in rechargeable lithium ion **batteries**)
- IT Fluoropolymers, uses  
Polyurethanes, uses  
RL: NUU (Other use, unclassified); USES (Uses)  
(adhesive, **cathode** plate or anode plate having comprehensive properties for use in rechargeable lithium ion **batteries**)
- IT Battery anodes  
Battery **cathodes**  
(**cathode** plate or anode plate having comprehensive properties for use in rechargeable lithium ion **batteries**)
- IT Carbon fibers, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(graphite; additives, **cathode** plate or anode plate having comprehensive properties for use in rechargeable lithium ion **batteries**)
- IT Secondary **batteries**  
(lithium; lithium ion, **cathode** plate or anode plate having comprehensive properties for use in rechargeable lithium ion **batteries**)
- IT 7440-44-0, Activated carbon, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(activated; additives, **cathode** plate or anode plate having comprehensive properties for use in rechargeable lithium ion **batteries**)
- IT 554-13-2, Lithium carbonate 1310-65-2,  
Lithium hydroxide 1344-28-1, Alumina, uses 9004-62-0,  
Hydroxyethyl cellulose  
RL: MOA (Modifier or additive use); USES (Uses)  
(additives, **cathode** plate or anode plate having comprehensive properties for use in rechargeable lithium ion **batteries**)
- IT 9004-32-4, Sodium carboxymethyl cellulose 24937-79-9,  
Poly(vinylidene difluoride) 25014-41-9, Polyacrylonitrile  
RL: NUU (Other use, unclassified); USES (Uses)  
(adhesive, **cathode** plate or anode plate having comprehensive properties for use in rechargeable lithium ion **batteries**)
- IT 11126-15-1, Lithium vanadium oxide 15365-14-7 39457-42-6,  
Lithium manganese oxide 52627-24-4, Lithium cobalt oxide  
RL: TEM (Technical or engineered material use); USES (Uses)  
(anode plate active material, **cathode** plate or anode plate having comprehensive properties for use in rechargeable lithium ion **batteries**)

L48 ANSWER 5 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2006:996575 HCAPLUS Full-text

DOCUMENT NUMBER: 145:377970

TITLE: Method for preparing phosphate/polyacenic  
semiconductor **composite** as  
**cathode** of lithium ion  
**battery**

INVENTOR(S): Wang, Rongshun; Xie, Haiming; Zhang, Lingyun;  
Pan, Xiumei; Su, Zhongmin

PATENT ASSIGNEE(S): Northeast Normal University, Peop. Rep. China

SOURCE: Faming Zhuanli Shenqing Gongkai Shuomingshu,  
10pp.

CODEN: CNXXEV

DOCUMENT TYPE: Patent  
 LANGUAGE: Chinese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

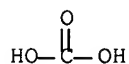
| PATENT NO. | KIND | DATE     | APPLICATION NO.  | DATE     |
|------------|------|----------|------------------|----------|
| CN 1834153 | A    | 20060920 | CN 2006-10016631 | 20060302 |
|            |      |          | CN 2006-10016631 | 20060302 |

PRIORITY APPLN. INFO.:

AB The title method includes: (1) carrying out reaction of 1 mol phenol with excess of formaldehyde under the catalysis of ammonium hydroxide at 50-90°C for 4-10 h, neutralizing with hydrochloric acid, reacting another 2-3 h to obtain water-soluble phenolic resin, adding reaming agent into phenolic resin to cure for 3-24 h, placing into a high-temperature furnace with an automatic temperature-controlling apparatus to pyrolyze at 400-1100°C at heating rate of 0.2-30°C/h under nitrogen gas atmospheric, washing the obtained product, drying, and pulverizing to obtain black and metallic luster polyacenic semiconductor (PAS) material, (2) **mixing** lithium salt, ferrous salt, and phosphate at stoichiometric ratio, adding PAS 1-20 weight%, and ball-milling for 5-10 h, (3) calcining at 250-350°C for 3-20 h under protective atmospheric, cooling, grinding to obtain powdery material, and (4) sintering the powdery material at 400-900° for 3-24 h to obtain the final product.

IT 554-13-2, Lithium carbonate 7789-24-4, Lithium fluoride, uses 26134-62-3, Lithium nitride  
 RL: **MOA (Modifier or additive use); USES (Uses)**  
 (preparation of phosphate/polyacenic semiconductor **composite** as **cathode** of lithium ion battery)

RN 554-13-2 HCAPLUS  
 CN Carbonic acid, lithium salt (1:2) (CA INDEX NAME)

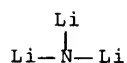


●<sub>2</sub> Li

RN 7789-24-4 HCAPLUS  
 CN Lithium fluoride (LiF) (CA INDEX NAME)

F-Li

RN 26134-62-3 HCAPLUS  
 CN Lithium nitride (Li<sub>3</sub>N) (CA INDEX NAME)



- CC 37-6 (Plastics Manufacture and Processing)  
Section cross-reference(s): 52
- ST phosphate polyacenic semiconductor prepn **cathode lithium ion battery**
- IT Battery **cathodes**  
Semiconductor materials  
(preparation of phosphate/polyacenic semiconductor **composite as cathode of lithium ion battery**)
- IT Polyacenes  
RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); POF (Polymer in formulation); PYP (Physical process); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)  
(preparation of phosphate/polyacenic semiconductor **composite as cathode of lithium ion battery**)
- IT Phenolic resins, preparation  
RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)  
(preparation of phosphate/polyacenic semiconductor **composite as cathode of lithium ion battery**)
- IT Phosphates, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(preparation of phosphate/polyacenic semiconductor **composite as cathode of lithium ion battery**)
- IT Carbon black, uses  
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)  
(preparation of phosphate/polyacenic semiconductor **composite as cathode of lithium ion battery**)
- IT Fluoropolymers, uses  
RL: PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)  
(preparation of phosphate/polyacenic semiconductor **composite as cathode of lithium ion battery**)
- IT 9003-07-0, Polypropylene  
RL: PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)  
(membrane; preparation of phosphate/polyacenic semiconductor **composite as cathode of lithium ion battery**)
- IT 9003-35-4P, Phenol-formaldehyde copolymer  
RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)  
(preparation of phosphate/polyacenic semiconductor **composite as cathode of lithium ion battery**)
- IT 516-03-0, Ferrous oxalate 554-13-2, Lithium carbonate 1310-65-2, Lithium hydroxide 1314-56-3, Phosphorus pentaoxide, uses 1345-25-1, Ferrous oxide, uses 7550-35-8, Lithium bromide 7722-76-1, Ammonium dihydrogen phosphate 7783-28-0 7789-24-4, Lithium fluoride, uses 10045-86-0, Ferric phosphate 10377-51-2, Lithium iodide 10377-52-3, Lithium phosphate 21324-40-3, Lithium hexafluorophosphate (LiPF<sub>6</sub>)

26134-62-3, Lithium nitride

RL: MOA (Modifier or additive use); USES (Uses)

(preparation of phosphate/polyacenic semiconductor **composite**  
as **cathode** of **lithium ion battery**)

IT 7447-41-8, Lithium chloride, uses 9002-84-0, PTFE 14013-86-6,  
Ferrous nitrate

RL: PEP (Physical, engineering or chemical process); PYP (Physical  
process); TEM (Technical or engineered material use); PROC  
(Process); USES (Uses)

(preparation of phosphate/polyacenic semiconductor **composite**  
as **cathode** of **lithium ion battery**)

L48 ANSWER 6 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2006:346487 HCAPLUS Full-text

DOCUMENT NUMBER: 144:453230

TITLE: Surface modified **lithium ion**  
**battery positive**  
**electrode** material and preparation  
method

INVENTOR(S): Zhao, Xinbing; Tu, Jian; Cao, Gaoshao; Zhu,  
Tiejun; Tu, Jiangping

PATENT ASSIGNEE(S): Zhejiang University, Peop. Rep. China

SOURCE: Faming Zhuanli Shenqing Gongkai Shuomingshu, 12  
pp.  
CODEN: CNXXEV

DOCUMENT TYPE: Patent

LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

| PATENT NO. | KIND | DATE     | APPLICATION NO.  | DATE         |
|------------|------|----------|------------------|--------------|
| -----      | ---- | -----    | -----            |              |
| CN 1731605 | A    | 20060208 | CN 2005-10050872 | 200507<br>27 |
|            |      |          | CN 2005-10050872 | 200507<br>27 |

PRIORITY APPLN. INFO.:

AB The title surface modified **lithium ion battery pos. electrode** material  
comprises one surface impregnated modification layer of at least one **pos.**  
**electrode** active material selected from  $\text{LiMO}_2$  ( $\text{M}=\text{Co}, \text{Ni}$  or  $\text{Mn}$ ),  $\text{LiNi}_{1-x}\text{Co}_x\text{O}_2$   
( $0 < x < 1$ ),  $\text{LiMn}_2\text{O}_4$  and  $\text{LiNi}_{1/3}\text{Co}_{1/3}\text{Mn}_{1/3}\text{O}_2$ ; and an oxide layer covered thereon,  
the non-oxygen element in the surface modification layer and oxide layer is  
0.1-15 wt% of **pos. electrode** active material; the oxide layer contains oxide  
of at least one of Mg, Al, Zn, Ni, Co, Fe, Li, Ca, K, Na, La, Nd, Ce, Sn and  
Ti; the surface modification layer is obtained by doping Mg, Al, Zn, Ni, Co,  
Fe, Li, Ca, K, Na, La, Nd, Ce, Sn or Ti in the surface of **pos. electrode**  
active material particles. The preparation method includes uniformly mixing  
additive and **pos. electrode** active material to obtain a homogenous **mixture**;  
pressing into a block under 3-20 MPa; heating to 50-400°C for 0.1-8.0 h; and  
heating to 200-900°C for 0.1-8.0 h to obtain the final product.

IT 12057-24-8, Lithium oxide, uses

RL: PEP (Physical, engineering or chemical process); PYP (Physical  
process); TEM (Technical or engineered material use); PROC  
(Process); USES (Uses)

(surface modified **lithium ion battery**  
**pos. electrode** material and preparation method)

RN 12057-24-8 HCAPLUS

CN Lithium oxide (Li<sub>2</sub>O) (CA INDEX NAME)

Li-O-Li

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 72  
ST surface modified lithium ion battery pos  
electrode material prepn  
IT Electrodes  
Secondary batteries  
Surface treatment  
(surface modified lithium ion battery  
pos. electrode material and preparation method)  
IT Carbon black, uses  
Fluoropolymers, uses  
RL: PEP (Physical, engineering or chemical process); PYP (Physical  
process); TEM (Technical or engineered material use); PROC  
(Process); USES (Uses)  
(surface modified lithium ion battery  
pos. electrode material and preparation method)  
IT 105-58-8, Ethyl carbonate 616-38-6, Dimethyl carbonate  
1305-78-8, Calcium oxide, uses 1306-38-3, Cerium oxide, uses  
1307-96-6, Cobalt oxide, uses 1309-37-1, Iron oxide, uses  
1309-48-4, Magnesia, uses 1312-81-8, Lanthanum oxide 1313-59-3,  
Sodium oxide, uses 1313-97-9, Neodymium oxide 1313-99-1, Nickel  
oxide, uses 1314-13-2, Zinc oxide, uses 1332-29-2, Tin oxide  
1344-28-1, Alumina, uses 7429-90-5, Aluminum, uses 7439-89-6,  
Iron, uses 7439-91-0, Lanthanum, uses 7439-93-2, Lithium, uses  
7439-95-4, Magnesium, uses 7440-00-8, Neodymium, uses 7440-02-0,  
Nickel, uses 7440-09-7, Potassium, uses 7440-23-5, Sodium, uses  
7440-31-5, Tin, uses 7440-32-6, Titanium, uses 7440-45-1,  
Cerium, uses 7440-48-4, Cobalt, uses 7440-66-6, Zinc, uses  
7440-70-2, Calcium, uses 7779-88-6, Zinc nitrate 7790-69-4,  
Lithium nitrate 9002-84-0, Polytetrafluoroethylene 10141-05-6,  
Cobalt nitrate 12057-24-8, Lithium oxide, uses  
12136-45-7, Potassium oxide, uses 13463-67-7, Titanium oxide, uses  
13473-90-0, Aluminum nitrate 39457-42-6, Lithium manganese oxide  
RL: PEP (Physical, engineering or chemical process); PYP (Physical  
process); TEM (Technical or engineered material use); PROC  
(Process); USES (Uses)  
(surface modified lithium ion battery  
pos. electrode material and preparation method)

L48 ANSWER 7 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2006:116848 HCAPLUS Full-text

DOCUMENT NUMBER: 144:174332

TITLE: Cathode active mass for secondary  
lithium battery, its  
manufacture, and its usage

INVENTOR(S): Sun, Yucheng; Chen, Liquan; Huang, Xuejie

PATENT ASSIGNEE(S): Institute of Physics, Chinese Academy of  
Sciences, Peop. Rep. China

SOURCE: Faming Zhuanli Shenqing Gongkai Shuomingshu, 20  
pp.

CODEN: CNXXEV

DOCUMENT TYPE: Patent

LANGUAGE: Chinese

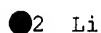
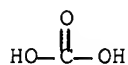
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

| PATENT NO.<br>-----    | KIND<br>---- | DATE<br>----- | APPLICATION NO.<br>----- | DATE         |
|------------------------|--------------|---------------|--------------------------|--------------|
| CN 1595687             | A            | 20050316      | CN 2003-156806           | 200309<br>08 |
| PRIORITY APPLN. INFO.: |              |               | CN 2003-156806           | 200309<br>08 |

AB The **cathode** active mass is  $\text{LiMn}_{2-z}\text{MzO}_4$  ( $0 \leq z \leq 0.5$ , and  $\text{M} = \text{Li}, \text{Mg}, \text{Co}, \text{Ni}, \text{Fe}, \text{Al}, \text{Sr}, \text{Cr}, \text{Ga}, \text{Cu}, \text{and/or Zn}$ ) and has a pos. spinel structure. The active mass is prepared by **mixing** a 1.0-1.0M solution of soluble Mn and M salts with a 2.0-8.0M alkaline solution and a 0.1-2M additive solution, stirring the **mixture**, filtering, washing the precipitate, and drying the precipitate to obtain a precursor; adding the precursor to a 0.1-2M solution of a soluble salt of a modifier at a modifier:precursor mol ratio (0.1-0.3):1, stirring, adding a complexing agent at a complexing agent:modifier mol ratio (0.5-2):1 to the **mixture**, heating under stirring at 50-90° to evaporate water to obtain a modifier coated precursor; **mixing** the modifier coated precursor and a Li salt at a mol ratio 2:(1.0-1.1), adding 20-80% water to a slurry with an adjusted viscosity, and mist spraying the obtain 1-100  $\mu\text{m}$  solid particles, and firing the particles at 400-950° for 1-48 h. The modifier coated precursor may also be obtained by adding a precipitating agent to the precursor-modifier **mixture** to adjust the slurry to pH 7, heating under stirring at 50-90°, and filtering the precipitate

IT 554-13-2, Lithium carbonate 7789-24-4, Lithium fluoride, uses 12057-24-8, Lithium oxide, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(comps. and manufacture of pos. spinel type substituted lithium manganese oxide for secondary lithium battery cathodes)

RN 554-13-2 HCAPLUS  
CN Carbonic acid, lithium salt (1:2) (CA INDEX NAME)



RN 7789-24-4 HCAPLUS  
CN Lithium fluoride ( $\text{LiF}$ ) (CA INDEX NAME)



RN 12057-24-8 HCAPLUS  
CN Lithium oxide ( $\text{Li}_2\text{O}$ ) (CA INDEX NAME)



Li-O-Li

- IC ICM H01M004-48  
ICS H01M004-04; C01D015-02
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
- ST pos spinel structure **lithium** manganese oxide  
**cathode** manuf
- IT Battery **cathodes**  
(**compns.** and manufacture of pos. spinel type substituted  
lithium manganese oxide for secondary **lithium**  
**battery cathodes**)
- IT 874383-59-2P, Lithium manganese oxide (Li1.05Mn1.98O4)  
RL: DEV (Device component use); IMF (Industrial manufacture); PREP  
(Preparation); USES (Uses)  
(**Cathode** active mass for secondary **lithium**  
**battery**, its manufacture, and its usage)
- IT 12031-75-3P, Lithium manganese nickel oxide (LiMn1.5Ni0.5O4)  
12057-17-9P, Lithium manganese oxide (LiMn2O4) 130260-87-6P,  
Chromium lithium manganese oxide (Cr0.1LiMn1.9O4) 130732-38-6P,  
Iron lithium manganese oxide (Fe0.2LiMn1.8O4) 136479-29-3P,  
Calcium lithium manganese oxide (Ca0.1LiMn1.9O4) 136479-30-6P,  
Lithium manganese zinc oxide (LiMn1.9Zn0.1O4) 136479-37-3P,  
Lithium magnesium manganese oxide (LiMg0.2Mn1.8O4) 145896-59-9P,  
Aluminum lithium manganese oxide (Al0.1LiMn1.9O4) 146956-26-5P,  
Cobalt lithium manganese oxide (Co0.1LiMn1.9O4) 176979-23-0P,  
Lithium manganese oxide (Li1.15Mn1.85O4) 189218-41-5P, Lithium  
manganese nickel oxide (LiMn1.95Ni0.05O4) 201857-53-6P, Copper  
lithium manganese oxide (Cu0.05LiMn1.95O4) 216005-44-6P, Lithium  
magnesium manganese oxide (LiMg0.05Mn1.95O4) 220516-32-5P,  
Aluminum lithium manganese oxide (Al0.05LiMn1.95O4) 220516-34-7P,  
Aluminum lithium manganese oxide (Al0.15LiMn1.85O4) 371773-17-0P,  
Lithium magnesium manganese nickel oxide (LiMg0.1Mn1.5Ni0.4O4)  
799283-36-6P, Lithium manganese strontium oxide (LiMn1.95Sr0.05O4)  
874383-60-5P; Chromium lithium manganese nickel oxide  
(Cr0.25LiMn1.5Ni0.25O4) 874383-62-7P, Cobalt lithium manganese  
nickel oxide (Co0.2LiMn1.5Ni0.3O4)  
RL: DEV (Device component use); IMF (Industrial manufacture); PREP  
(Preparation); USES (Uses)  
(**compns.** and manufacture of pos. spinel type substituted  
lithium manganese oxide for secondary **lithium**  
**battery cathodes**)
- IT 554-13-2, Lithium carbonate 1308-04-9, Cobalt oxide  
(Co2O3) 1308-06-1, Cobalt oxide (Co3O4) 1309-48-4, Magnesia,  
uses 1314-23-4, Zirconia, uses 1344-28-1, Alumina, uses  
7784-30-7, Aluminum phosphate (AlPO4) 7789-24-4, Lithium  
fluoride, uses 10377-52-3, Lithium phosphate (Li3PO4)  
12003-67-7, Lithium aluminate (LiAlO2) 12057-24-8, Lithium  
oxide, uses 12190-79-3, Cobalt lithium oxide (CoLiO2)  
13463-67-7, Titania, uses 99489-75-5, Chromium lithium oxide  
(Cr2LiO4)  
RL: MOA (**Modifier or additive use**); USES (Uses)  
(**compns.** and manufacture of pos. spinel type substituted  
lithium manganese oxide for secondary **lithium**  
**battery cathodes**)
- IT 68-04-2, Trisodium citrate 77-92-9, Citric acid, uses 87-69-4,  
Tartaric acid, uses 1336-21-6, Ammonium hydroxide 7722-84-1,  
Hydrogen peroxide, uses  
RL: NUU (Other use, unclassified); USES (Uses)

(**compns.** and manufacture of pos. spinel type substituted  
lithium manganese oxide for secondary lithium  
battery cathodes)

L48 ANSWER 8 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2005:522870 HCAPLUS Full-text

DOCUMENT NUMBER: 143:62637

TITLE: **Positive electrode** auxiliary  
active substance for nonaqueous electrolyte  
secondary battery, **Positive**  
**electrode** auxiliary active substance for  
nonelectrolyte secondary battery,  
**positive electrode** active  
substance for the battery, the battery, and  
manufacture thereof

INVENTOR(S): Sakamoto, Takako; Eto, Hiroyasu

PATENT ASSIGNEE(S): Nichia Chemical Industries Co., Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 28 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

| PATENT NO.    | KIND | DATE     | APPLICATION NO. | DATE         |
|---------------|------|----------|-----------------|--------------|
| -----         | ---  | -----    | -----           |              |
| JP 2005158612 | A    | 20050616 | JP 2003-397886  | 200311<br>27 |
|               |      |          | JP 2003-397886  | 200311<br>27 |

PRIORITY APPLN. INFO.:

AB Disclosed is a **pos. electrode** auxiliary active substance for a nonaq.  
electrolyte secondary battery which is made from Li transition metal **composite**  
oxide having spinel structure, on the surface of which has B, F, and Mg whose  
concns. are higher on the surface than those in the inside. Further, the Li  
transition metal **composite** oxide has Li at 16c site of the crystal structure.

IT 12057-24-8, Lithium oxide, uses

RL: DEV (Device component use); USES (Uses)

(**composite** metal oxide; **pos.**

**electrode** auxiliary active substance for nonaq.

electrolyte Li secondary battery)

RN 12057-24-8 HCAPLUS

CN Lithium oxide (Li<sub>2</sub>O) (CA INDEX NAME)

Li-O-Li

IC ICM H01M004-58

ICS H01M004-02; H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **pos electrode** auxiliary active substance nonaq  
electrolyte secondary battery; **lithium** secondary  
**battery** transition metal **composite** oxide

IT Secondary batteries

(**lithium**; **pos. electrode**

auxiliary active substance for nonaq. electrolyte  
Li secondary battery)

IT Battery electrodes  
(pos. electrode auxiliary active substance  
for nonaq. electrolyte Li secondary battery)

IT Transition metal oxides  
RL: DEV (Device component use); USES (Uses)  
(pos. electrode auxiliary active substance  
for nonaq. electrolyte Li secondary battery)

IT 12057-24-8, Lithium oxide, uses  
RL: DEV (Device component use); USES (Uses)  
(composite metal oxide; pos.  
electrode auxiliary active substance for nonaq.  
electrolyte Li secondary battery)

IT 7439-95-4, Magnesium, uses 7440-42-8, Boron, uses 7782-41-4,  
Fluorine, uses  
RL: DEV (Device component use); USES (Uses)  
(pos. electrode auxiliary active substance  
for nonaq. electrolyte Li secondary battery)

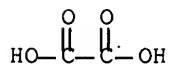
L48 ANSWER 9 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN  
ACCESSION NUMBER: 2005:209774 HCAPLUS Full-text  
DOCUMENT NUMBER: 142:282844  
TITLE: Manufacture of lithium manganese nickel  
composite oxide, and cathode  
active mass for secondary nonaqueous electrolyte  
battery which uses the oxide  
INVENTOR(S): Sasaoka, Hideo; Oda, Shuhei; Yoshikawa, Shinichi  
PATENT ASSIGNEE(S): Sumitomo Metal Mining Co., Ltd., Japan  
SOURCE: Jpn. Kokai Tokkyo Koho, 12 pp.  
CODEN: JKXXAF  
DOCUMENT TYPE: Patent  
LANGUAGE: Japanese  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

| PATENT NO.                            | KIND | DATE     | APPLICATION NO. | DATE         |
|---------------------------------------|------|----------|-----------------|--------------|
| -----                                 | ---- | -----    | -----           |              |
| JP 2005060162                         | A    | 20050310 | JP 2003-291689  | 200308<br>11 |
| PRIORITY APPLN. INFO.: JP 2003-291689 |      |          |                 | 200308<br>11 |

AB The oxide, having a spinel structure and a general formula of  $\text{Li}_{1+x}\text{Mn}_2\text{-y-xNi}_y\text{O}_4$  ( $x = -0.05-0.1$ ; and  $y = 0.45-0.55$ ), is manufactured by preparing a mixed aqueous solution by dissolving a water-soluble Li salt,  $\text{Ni}(\text{NO}_3)_2$ , and  $\text{Mn}(\text{NO}_3)_2$  in  $\text{H}_2\text{O}$ ; adding a metal ion-free nonionic water-soluble organic compound to the mixed aqueous solution until the concentration of the organic compound becomes 0.1-0.2 M (vs. total moles of Li, Mn, and Ni); synthesizing a Li Mn Ni composite oxide precursor by heat removing water and nitrate group in the mixed aqueous solution at  $\geq 150^\circ$ ; and heat treating the precursor in an O atmospheric

IT 553-91-3, Lithium oxalate  
RL: MOA (Modifier or additive use); USES (Uses)  
(manufacture of lithium manganese nickel composite oxides  
for secondary lithium battery  
cathodes)

RN 553-91-3 HCAPLUS  
 CN Ethanedioic acid, lithium salt (1:2) (CA INDEX NAME)



●2 Li

IC ICM C01G053-00  
 ICS H01M004-02; H01M004-58  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST secondary **battery cathode lithium**  
 manganese nickel **composite** oxide manuf  
 IT Battery **cathodes**  
 (manufacture of **lithium** manganese nickel **composite**  
 oxides for secondary **lithium battery**  
**cathodes**)  
 IT 12031-75-3P, Lithium manganese nickel oxide (LiMn<sub>1.5</sub>Ni<sub>0.5</sub>O<sub>4</sub>)  
 RL: DEV (Device component use); IMF (Industrial manufacture); PREP  
 (Preparation); USES (Uses)  
 (manufacture of **lithium** manganese nickel **composite** oxides  
 for secondary **lithium battery**  
**cathodes**)  
 IT 64-19-7, Acetic acid, uses 77-92-9, Citric acid, uses 144-62-7,  
 Oxalic acid, uses 553-91-3, Lithium oxalate  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (manufacture of **lithium** manganese nickel **composite** oxides  
 for secondary **lithium battery**  
**cathodes**)

L48 ANSWER 10 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2002:292166 HCAPLUS Full-text

DOCUMENT NUMBER: 136:328120

TITLE: Nonaqueous electrolyte secondary **battery**  
 with **lithium** complex oxide  
**positive electrode mix**  
 additionally containing lithium carbonate for  
 improved charge-discharge cycle characteristic  
 at high temperature

INVENTOR(S): Hosoya, Mamoru; Fukushima, Gen

PATENT ASSIGNEE(S): Sony Corp., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 14 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

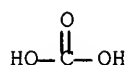
FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

| PATENT NO.             | KIND | DATE     | APPLICATION NO. | DATE         |
|------------------------|------|----------|-----------------|--------------|
| -----                  | ---- | -----    | -----           |              |
| JP 2002117843          | A    | 20020419 | JP 2000-306875  | 200010<br>05 |
| PRIORITY APPLN. INFO.: |      |          | JP 2000-306875  | 200010       |

05

- AB A nonaq. electrolyte secondary battery comprises a  $\text{Li}_x\text{Fe}_{1-y}\text{M}_y\text{PO}_4$  (M is Mn, Cr, Co, Cu, Ni, V, Mo, Ti, Zn, Al, Ga, Mg, B, and/or Nb;  $x = 0.05-1.2$ ,  $y \leq 0.8$ ), **pos. electrode** active **mix** addnl. containing  $\text{Li}_2\text{CO}_3$ . The battery has improved charge-discharge cycle characteristic at high temperature
- IT 554-13-2, Lithium carbonate  
 RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)  
 (nonaq. electrolyte secondary battery with lithium complex oxide **pos. electrode** **mix** addnl. containing lithium carbonate for improved charge-discharge cycle characteristic at high temperature)
- RN 554-13-2 HCAPLUS
- CN Carbonic acid, lithium salt (1:2) (CA INDEX NAME)



●2 Li

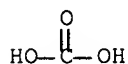
- IC ICM H01M004-58  
 ICS H01M004-02; H01M010-40
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
- ST olivine crystal structure **pos electrode**  
**lithium carbonate battery**
- IT Battery **cathodes**  
 (nonaq. electrolyte secondary battery with lithium complex oxide **pos. electrode** **mix** addnl. containing lithium carbonate for improved charge-discharge cycle characteristic at high temperature)
- IT Olivine-group minerals  
 RL: DEV (Device component use); USES (Uses)  
 (nonaq. electrolyte secondary battery with lithium complex oxide **pos. electrode** **mix** addnl. containing lithium carbonate for improved charge-discharge cycle characteristic at high temperature)
- IT 15365-14-7, Iron lithium phosphate ( $\text{FeLiPO}_4$ ) 407629-83-8  
 407629-87-2 407629-90-7 407629-95-2 407630-01-7 407630-05-1  
 407630-10-8 407630-14-2 407630-25-5, Aluminum iron lithium phosphate ( $\text{Al}_{0.7}\text{Fe}_{0.3}\text{Li}(\text{PO}_4)$ ) 407630-29-9, Gallium iron lithium phosphate ( $\text{Ga}_{0.7}\text{Fe}_{0.3}\text{Li}(\text{PO}_4)$ ) 407630-35-7 407630-40-4, Boron iron lithium phosphate ( $\text{B}_{0.75}\text{Fe}_{0.25}\text{Li}(\text{PO}_4)$ ) 407630-46-0  
 412267-84-6, Iron lithium zinc phosphate ( $\text{Fe}_{0.3}\text{LiZn}_{0.7}(\text{PO}_4)$ )  
 RL: DEV (Device component use); USES (Uses)  
 (nonaq. electrolyte secondary battery with lithium complex oxide **pos. electrode** **mix** addnl. containing lithium carbonate for improved charge-discharge cycle characteristic at high temperature)
- IT 554-13-2, Lithium carbonate  
 RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)  
 (nonaq. electrolyte secondary battery with lithium complex oxide **pos. electrode** **mix** addnl. containing lithium carbonate for improved

charge-discharge cycle characteristic at high temperature)

L48 ANSWER 11 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN  
 ACCESSION NUMBER: 2001:796626 HCAPLUS Full-text  
 DOCUMENT NUMBER: 135:346884  
 TITLE: Secondary nonaqueous electrolyte batteries  
 INVENTOR(S): Tabuchi, Toru  
 PATENT ASSIGNEE(S): Japan Storage Battery Co., Ltd., Japan  
 SOURCE: Jpn. Kokai Tokkyo Koho, 6 pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

| PATENT NO.<br>-----                   | KIND<br>---- | DATE<br>----- | APPLICATION NO.<br>----- | DATE         |
|---------------------------------------|--------------|---------------|--------------------------|--------------|
| JP 2001307774                         | A            | 20011102      | JP 2000-121720           | 200004<br>21 |
| PRIORITY APPLN. INFO.: JP 2000-121720 |              |               |                          | 200004<br>21 |

AB The batteries use **cathodes** containing Li<sub>2</sub>CO<sub>3</sub>, and electrolyte solns. containing LiPF<sub>6</sub> in addition to LiBF<sub>4</sub>, Li amide salt, or Li(C<sub>2</sub>F<sub>5</sub>)<sub>n</sub>PF<sub>6</sub>-n (n = 1-6).  
 IT 554-13-2, Lithium carbonate  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (cathodes containing lithium carbonate for secondary lithium batteries)  
 RN 554-13-2 HCAPLUS  
 CN Carbonic acid, lithium salt (1:2) (CA INDEX NAME)



●2 Li

IC ICM H01M010-40  
 ICS H01M010-40; H01M004-02  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST secondary battery cathode lithium carbonate additive; lithium hexafluorophosphate electrolyte additive secondary lithium battery  
 IT Battery cathodes  
 (cathodes containing lithium carbonate for secondary lithium batteries)  
 IT Battery electrolytes  
 (electrolyte solns. containing lithium hexafluorophosphate and other lithium salts for secondary lithium batteries)  
 )  
 IT Secondary batteries  
 (lithium; secondary lithium batteries)

with lithium carbonate containing **cathode** and **mixed** salt electrolytes containing lithium hexafluorophosphate)

- IT 12190-79-3, Cobalt lithium oxide (CoLiO<sub>2</sub>)  
 RL: DEV (Device component use); USES (Uses)  
 (**cathodes** containing lithium carbonate for secondary lithium batteries)
- IT 554-13-2, Lithium carbonate  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (**cathodes** containing lithium carbonate for secondary lithium batteries)
- IT 96-49-1, Ethylene carbonate 623-53-0, Ethyl methyl carbonate  
 14283-07-9, Lithium fluoroborate 21324-40-3, Lithium hexafluorophosphate 90076-65-6 206057-04-7  
 RL: DEV (Device component use); USES (Uses)  
 (electrolyte solns. containing lithium hexafluorophosphate and other lithium salts for secondary lithium batteries  
 )

L48 ANSWER 12 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2001:479599 HCAPLUS Full-text

DOCUMENT NUMBER: 135:79438

TITLE: Lithium borate doped lithium manganese oxide, secondary lithium battery, and manufacture of the oxide

INVENTOR(S): Yamaguchi, Munetoshi

PATENT ASSIGNEE(S): Mitsui Mining and Smelting Co., Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 6 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

| PATENT NO.<br>-----    | KIND<br>---- | DATE<br>----- | APPLICATION NO.<br>----- | DATE               |
|------------------------|--------------|---------------|--------------------------|--------------------|
| JP 2001180938          | A            | 20010703      | JP 1999-372524           | 199912<br>28       |
| JP 2005112710          | A            | 20050428      | JP 2003-427056           | 200312<br>24       |
| JP 2005112711          | A            | 20050428      | JP 2003-427057           | 200312<br>24       |
| JP 3763537             | B2           | 20060405      |                          |                    |
| PRIORITY APPLN. INFO.: |              |               | JP 1999-372524           | A3<br>199912<br>28 |

AB The oxide is  $\text{Li}_x\text{Mn}_{2-y}\text{M}_y\text{O}_{4-n}\text{LiB}_4\text{O}_7$ , where M = Al and/or Mg,  $1 < x \leq 1.1$ ,  $0 < y \leq 0.2$ , and  $0.002 \leq n \leq 0.05$ . Secondary Li batteries use the oxide for **cathodes**. The oxide is prepared by using Li borate as B source.

- IT 12007-60-2, Lithium borate (Li<sub>2</sub>B<sub>4</sub>O<sub>7</sub>)  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (**compsns.** and manufacture of lithium borate doped lithium manganese oxide for secondary lithium battery **cathodes**)

RN 12007-60-2 HCAPLUS

CN Boron lithium oxide (B4Li2O7) (CA INDEX NAME)

| Component | Ratio | Component<br>Registry Number |
|-----------|-------|------------------------------|
| O         | 7     | 17778-80-2                   |
| B         | 4     | 7440-42-8                    |
| Li        | 2     | 7439-93-2                    |

IC ICM C01G045-00

ICS C01B035-12; H01M004-02; H01M004-58; H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **battery cathode boron lithium**manganese oxide **compn** manuf; aluminum boron**lithium** manganese oxide **battery cathode**;magnesium boron **lithium** manganese oxide **battery**  
**cathode**IT **Battery cathodes**(compns. and manufacture of lithium borate doped lithium  
manganese oxide for secondary **lithium battery**  
**cathodes**)

IT 145896-59-9P, Aluminum lithium manganese oxide (Al0.1LiMn1.9O4)

204199-32-6P, Aluminum lithium manganese oxide

(Al0.05Li1.05Mn1.95O4) 267225-96-7P, Aluminum lithium manganese

oxide (Al0.2Li1.05Mn1.8O4) 347148-85-0P, Aluminum lithium

manganese oxide (Al0.1Li1.05Mn1.9O4) 347148-86-1P, Lithium

magnesium manganese oxide (Li1.05Mg0.1Mn1.9O4) 347148-87-2P,

Aluminum lithium manganese oxide (Al0.1Li1.02Mn1.9O4)

347148-88-3P, Aluminum lithium manganese oxide (Al0.1Li1.1Mn1.9O4)

347148-89-4P, Lithium magnesium manganese oxide (Li1.15Mg0.1Mn1.9O4)

347148-90-7P, Aluminum lithium manganese oxide

(Al0.25Li1.05Mn1.75O4)

RL: DEV (Device component use); IMF (Industrial manufacture); PREP

(Preparation); USES (Uses)

(compns. and manufacture of lithium borate doped lithium  
manganese oxide for secondary **lithium battery**  
**cathodes**)

IT 12007-60-2, Lithium borate (Li2B4O7)

RL: MOA (Modifier or additive use); USES (Uses)

(compns. and manufacture of lithium borate doped lithium  
manganese oxide for secondary **lithium battery**  
**cathodes**)

L48 ANSWER 13 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2001:137524 HCAPLUS Full-text

DOCUMENT NUMBER: 134:150145

TITLE: **Batteries** with lithium-based  
active material having extended cycle life

INVENTOR(S): Barker, Jeremy

PATENT ASSIGNEE(S): Valence Technology, Inc., USA

SOURCE: PCT Int. Appl., 40 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

|            |      |       |                 |       |
|------------|------|-------|-----------------|-------|
| PATENT NO. | KIND | DATE  | APPLICATION NO. | DATE  |
| -----      | ---- | ----- | -----           | ----- |
| -----      |      |       |                 |       |



WO 2001013443

A2

20010222

WO 2000-US18735

200007

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WO 2001013443

A3

20020117

W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR,  
 CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU,  
 ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT,  
 LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU,  
 SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ,  
 VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM  
 RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH,  
 CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE,  
 BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

US 6468695

B1

20021022

US 1999-376914

199908

18

US 2003082451

A1

20030501

US 2002-238862

200209

09

PRIORITY APPLN. INFO.:

US 1999-376914

A1

199908

18

AB A method of treating spinel lithium manganese oxide (LMO) particles comprise the steps: (a) forming a **mixture** comprising the LMO particles and LiOH and (b) heating the **mixture** for a time and at a temperature sufficient to decompose the LiOH, and to provide treated spinel LMO characterized by reduced surface area and increased lithium content as compared to untreated spinel LMO. In one embodiment, the invention provides a novel **composition** which is stabilized against decomposition when used as an active material for an electrochem. cell. The active material of the present invention comprises particles of spinel LMO enriched with lithium by a decomposition product of lithium hydroxide forming a part of each of the LMO particles. The spinel LMO product formed by the decomposition of lithium hydroxide in the presence of the LMO is characterized by a reduced surface area and increased capacity retention (reduced capacity fading) as compared to the initial, non-treated, non-enriched spinel. In another aspect, the treated spinel LMO product is combined with lithium carbonate in a **cathode mixture**

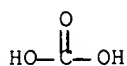
IT 554-13-2, Lithium carbonate

RL: DEV (Device component use); MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)

(batteries with lithium-based active material  
 having extended cycle life)

RN 554-13-2 HCAPLUS

CN Carbonic acid, lithium salt (1:2) (CA INDEX NAME)



●2 Li

IC ICM H01M004-00

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **battery lithium** manganese oxide spinelIT Battery **cathodes**

Heat treatment

(**batteries** with **lithium**-based active material  
having extended cycle life)

IT Fluoro rubber

RL: TEM (Technical or engineered material use); USES (Uses)  
(hexafluoropropene-vinylidene fluoride, binder; **batteries**  
with **lithium**-based active material having extended  
cycle life)

IT Secondary **batteries**

(**lithium**; **batteries** with **lithium**  
-based active material having extended cycle life)

IT 96-49-1, Ethylene carbonate 616-38-6, Dimethyl carbonate  
21324-40-3, **Lithium** hexafluorophosphate 39457-42-6,  
**Lithium** manganese oxide 304891-46-1, **Lithium** manganese  
oxide Li1.08-1.2Mn1.8-1.92O4

RL: DEV (Device component use); USES (Uses)  
(**batteries** with **lithium**-based active material  
having extended cycle life)

IT 554-13-2, **Lithium** carbonate 1310-65-2,  
**Lithium** hydroxide

RL: DEV (Device component use); MOA (Modifier or additive  
use); PEP (Physical, engineering or chemical process); PROC  
(Process); USES (Uses)  
(**batteries** with **lithium**-based active material  
having extended cycle life)

IT 7440-44-0, Carbon, uses

RL: MOA (Modifier or additive use); USES (Uses)  
(**batteries** with **lithium**-based active material  
having extended cycle life)

L48 ANSWER 14 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1999:172059 HCAPLUS Full-text

DOCUMENT NUMBER: 130:225329

TITLE: **Cathode** modification for improved  
performance of rechargeable **lithium**/  
**composite** polymer electrolyte-pyrite  
battery

AUTHOR(S): Strauss, E.; Golodnitsky, D.; Peled, E.

CORPORATE SOURCE: School of Chemistry, Tel Aviv University, Tel  
Aviv-Jaffa, 69978, Israel

SOURCE: Electrochemical and Solid-State Letters (1999),  
2(3), 115-117

CODEN: ESLEF6; ISSN: 1099-0062

PUBLISHER: Electrochemical Society

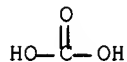
DOCUMENT TYPE: Journal

LANGUAGE: English

AB A process of **cathode** modification involving coating of the reduced  
(discharged) **cathode** particles by a very thin ion-conductive protective film,  
known as the solid electrolyte interphase (SEI) has been developed. The SEI  
is electrochem. formed by overdischarge of the cell. The formation of SEI on  
**cathodes** is designed to provide protection to the **cathode** active material in  
fully charged and/or fully discharged states and to improve the performance  
characteristics of the battery. Over 500 100% depth of discharge cycles (at  
C/3 rate), with a capacity fading rate of less than 0.1%/cycle were carried out  
in small (1 cm<sup>2</sup> area) laboratory prototype cells with 7  $\mu$ m thick modified  
**cathodes**. This **cathode** coating enables the increase of the charge rate up to  
C/2 with no adverse effects. The anticipated specific energy of the battery  
employing an optimized 10  $\mu$ m thick pyrite **composite cathode** is 130 Wh/kg and  
its projected continuous specific power is about 300 W/kg on the basis of 5

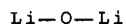
mA/cm<sup>2</sup> discharge tests. XPS measurements indicate that this **cathode** protective film contains Li<sub>2</sub>CO<sub>3</sub> and Li<sub>2</sub>O.

- IT 554-13-2, Lithium carbonate 12057-24-8, Lithia, formation (nonpreparative)  
 RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative) (protective film; **cathode modification** for improved performance of rechargeable lithium/**composite** polymer electrolyte-pyrite battery)  
 RN 554-13-2 HCAPLUS  
 CN Carbonic acid, lithium salt (1:2) (CA INDEX NAME)



●2 Li

- RN 12057-24-8 HCAPLUS  
 CN Lithium oxide (Li<sub>2</sub>O) (CA INDEX NAME)



- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 38  
 ST lithium **composite** polymer electrolyte pyrite battery  
 IT Battery **cathodes**  
 Battery electrolytes  
 (**cathode** modification for improved performance of rechargeable lithium/**composite** polymer electrolyte-pyrite battery)  
 IT Polyoxyalkylenes, uses  
 RL: DEV (Device component use); USES (Uses)  
 (**cathode** modification for improved performance of rechargeable lithium/**composite** polymer electrolyte-pyrite battery)  
 IT Secondary **batteries**  
 (**lithium**; **cathode** modification for improved performance of rechargeable lithium/**composite** polymer electrolyte-pyrite battery)  
 IT 7439-93-2, **Lithium**, uses 10377-51-2, **Lithium** iodide 12068-85-8, Iron sulfide fes2 25322-68-3, Peo  
 RL: DEV (Device component use); USES (Uses)  
 (**cathode** modification for improved performance of rechargeable lithium/**composite** polymer electrolyte-pyrite battery)  
 IT 96-49-1, Ethylene carbonate  
 RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)  
 (**cathode** modification for improved performance of rechargeable lithium/**composite** polymer electrolyte-pyrite battery)  
 IT 1344-28-1, Alumina, uses  
 RL: MOA (Modifier or additive use); USES (Uses)

(**cathode** modification for improved performance of rechargeable lithium/**composite** polymer electrolyte-pyrite battery)

IT 554-13-2, Lithium carbonate 12057-24-8, Lithia, formation (nonpreparative)

RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative) (protective film; **cathode modification** for improved performance of rechargeable lithium/**composite** polymer electrolyte-pyrite battery)

REFERENCE COUNT: 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L48 ANSWER 15 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1998:479119 HCAPLUS Full-text

DOCUMENT NUMBER: 129:111372

TITLE: Secondary nonaqueous electrolyte batteries

INVENTOR(S): Endo, Takuya; Takahashi, Kimio

PATENT ASSIGNEE(S): Sony Corp., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 5 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

| PATENT NO.<br>-----    | KIND<br>---- | DATE<br>----- | APPLICATION NO.<br>----- | DATE              |
|------------------------|--------------|---------------|--------------------------|-------------------|
| JP 10188953            | A            | 19980721      | JP 1996-359248           | 199612<br>27      |
| JP 3562187             | B2           | 20040908      |                          |                   |
| US 6022641             | A            | 20000208      | US 1997-996320           | 199712<br>22      |
| PRIORITY APPLN. INFO.: |              |               | JP 1996-359248           | A<br>199612<br>27 |

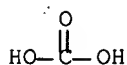
AB The **batteries** use Li or Li containing anodes and Mn oxide or Li Mn oxide **cathodes**, where the **cathode** active mass **mixture** contains, in dried state, 0.5-20% alkali metal carbonate.

IT 554-13-2, Lithium carbonate

RL: MOA (Modifier or additive use); USES (Uses)  
(manganese oxide and lithium manganese oxide  
**cathode** active mass containing alkali metal carbonate for  
batteries)

RN 554-13-2 HCAPLUS

CN Carbonic acid, lithium salt (1:2) (CA INDEX NAME)



IC ICM H01M004-02  
ICS H01M004-62; H01M010-40  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
ST secondary **lithium battery cathode**  
carbonate additive; **lithium battery**  
**cathode** alkali metal carbonate; manganese oxide  
**cathode** alkali metal carbonate  
IT Secondary **batteries**  
(**lithium**; manganese oxide and **lithium**  
manganese oxide **cathode** active mass containing alkali metal  
carbonate for batteries)  
IT 1313-13-9, Manganese dioxide, uses 12057-17-9, Lithium manganese  
oxide (LiMn2O4)  
RL: DEV (Device component use); USES (Uses)  
(manganese oxide and **lithium** manganese oxide  
**cathode** active mass containing alkali metal carbonate for  
batteries)  
IT 497-19-8, Sodium carbonate, uses 554-13-2, Lithium  
carbonate  
RL: MOA (Modifier or additive use); USES (Uses)  
(manganese oxide and **lithium** manganese oxide  
**cathode** active mass containing alkali metal carbonate for  
batteries)

L48 ANSWER 16 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN  
ACCESSION NUMBER: 1998:219958 HCAPLUS Full-text  
DOCUMENT NUMBER: 128:297099  
TITLE: Manufacture of nonaqueous solvent  
**lithium** secondary **batteries**  
and same batteries  
INVENTOR(S): Fujiwara, Masashi; Yamada, Shuji; Shirakawa,  
Yasuhiro; Ikazaki, Yoshiyuki; Sato, Masaji  
PATENT ASSIGNEE(S): Toshiba Corp., Japan  
SOURCE: Jpn. Kokai Tokkyo Koho, 23 pp.  
CODEN: JKXXAF  
DOCUMENT TYPE: Patent  
LANGUAGE: Japanese  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

| PATENT NO.             | KIND | DATE     | APPLICATION NO. | DATE         |
|------------------------|------|----------|-----------------|--------------|
| -----                  | ---- | -----    | -----           |              |
| JP 10092429            | A    | 19980410 | JP 1996-243788  | 199609<br>13 |
| JP 2971403             | B2   | 19991108 |                 |              |
| PRIORITY APPLN. INFO.: |      |          | JP 1996-243788  | 199609<br>13 |

AB In manufacture of the batteries using **cathodes** containing Li-containing Ni  
oxides or Li Mn oxides, **mixts.** of Li **compds.** and Ni **compds.** and/or Mn **compds.**  
are heat treated in O<sub>2</sub>-containing atmospheric at 670-950° to give the **cathode**  
active mass. The title batteries using **cathodes** containing LiNiO<sub>2</sub> grains and  
LiMn<sub>2</sub>O<sub>4</sub> grains, whereas a part of Ni in LiNiO<sub>2</sub> and Mn in LiMn<sub>2</sub>O<sub>4</sub> may have been  
substituted with another elements, and the grains have 0.1-1.5 weight% of Li  
oxide layer coatings. Preferably, Co, Mn, B, Al, and/or Li are substituted  
with Ni, and/or Co, Ni, B, Al, and/or Li are substituted with Mn. The

batteries inhibit locally overdischarging and overcharging in repeated charge-discharge cycling, and show long cycling life.

IT 12057-24-8P, Lithium oxide (Li<sub>2</sub>O), uses  
 RL: IMF (Industrial manufacture); MOA (Modifier or additive use); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (coatings on Li mixed oxide grains in cathodes  
 ; preparation of Li mixed oxide cathodes  
 for Li secondary batteries)  
 RN 12057-24-8 HCAPLUS  
 CN Lithium oxide (Li<sub>2</sub>O) (CA INDEX NAME)

Li-O-Li

IC ICM H01M004-58  
 ICS H01M004-02; H01M004-04; H01M010-40  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST lithium battery cathode mixed  
 oxide; nickel lithium oxide battery  
 cathode; manganese lithium oxide battery  
 cathode  
 IT Battery cathodes  
 (preparation of Li mixed oxide cathodes  
 for Li secondary batteries)  
 IT 12031-65-1P, Lithium nickel oxide (LiNiO<sub>2</sub>) 12057-17-9P, Lithium  
 manganese oxide (LiMn<sub>2</sub>O<sub>4</sub>) 101920-93-8P, Cobalt lithium nickel  
 oxide (Co<sub>0.5</sub>LiNi<sub>0.5</sub>O<sub>2</sub>) 145423-77-4P, Lithium manganese borate  
 oxide (LiMn<sub>1.9</sub>(BO<sub>3</sub>)<sub>0.1</sub>O<sub>3.7</sub>) 145896-59-9P, Aluminum lithium  
 manganese oxide (Al<sub>0.1</sub>LiMn<sub>1.9</sub>O<sub>4</sub>) 146956-26-5P, Cobalt lithium  
 manganese oxide (Co<sub>0.1</sub>LiMn<sub>1.9</sub>O<sub>4</sub>) 147787-62-0P, Lithium manganese  
 nickel oxide (LiMn<sub>1.9</sub>Ni<sub>0.1</sub>O<sub>4</sub>) 193214-24-3P, Aluminum cobalt  
 lithium nickel oxide (Al<sub>0.05</sub>Co<sub>0.15</sub>LiNi<sub>0.8</sub>O<sub>2</sub>) 197389-20-1P, Lithium  
 nickel borate oxide (LiNi<sub>0.97</sub>(BO<sub>3</sub>)<sub>0.03</sub>O<sub>1.91</sub>) 197389-21-2P,  
 Aluminum lithium nickel oxide (Al<sub>0.03</sub>LiNi<sub>0.97</sub>O<sub>2</sub>) 206279-78-9P,  
 Lithium nickel oxide (Li<sub>1.1</sub>Ni<sub>0.9</sub>O<sub>2</sub>) 206279-79-0P, Cobalt lithium  
 nickel oxide (Co<sub>0.2</sub>LiNi<sub>0.8</sub>O<sub>4</sub>)  
 RL: DEV (Device component use); IMF (Industrial manufacture); PREP  
 (Preparation); USES (Uses)  
 (cathodes; preparation of Li mixed oxide  
 cathodes for Li secondary batteries)  
 IT 12057-24-8P, Lithium oxide (Li<sub>2</sub>O), uses  
 RL: IMF (Industrial manufacture); MOA (Modifier or additive  
 use); TEM (Technical or engineered material use); PREP  
 (Preparation); USES (Uses)  
 (coatings on Li mixed oxide grains in cathodes  
 ; preparation of Li mixed oxide cathodes  
 for Li secondary batteries)  
 IT 1310-65-2, Lithium hydroxide 7439-96-5, Manganese, processes  
 12054-48-7, Nickel hydroxide [Ni(OH)<sub>2</sub>]  
 RL: PEP (Physical, engineering or chemical process); PROC (Process)  
 (in preparation of Li mixed oxide cathodes  
 for Li secondary batteries)

L48 ANSWER 17 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1995:229520 HCAPLUS Full-text

DOCUMENT NUMBER: 122:35186

TITLE: Secondary nonaqueous-electrolyte batteries with

INVENTOR(S): improved oxide **cathodes**  
 Uehara, Mayumi; Noma, Toshuki; Kurokawa,  
 Hiroshi; Saito, Toshihiko; Nishio, Koji  
 PATENT ASSIGNEE(S): Sanyo Electric Co, Japan  
 SOURCE: Jpn. Kokai Tokkyo Koho, 5 pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

| PATENT NO.<br>----- | KIND<br>---- | DATE<br>----- | APPLICATION NO.<br>----- | DATE         |
|---------------------|--------------|---------------|--------------------------|--------------|
| JP 06243870         | A            | 19940902      | JP 1993-47316            | 199302<br>12 |
| JP 3054511          | B2           | 20000619      | JP 1993-47316            | 199302<br>12 |

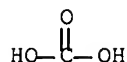
PRIORITY APPLN. INFO.:

AB Secondary **Li batteries** use  $\text{Li}_x\text{Ni}_{1-y}\text{Co}_y\text{O}_w$  ( $I$ ,  $0 < x < 1.3$ ;  $0 \leq y \leq 0.5$ ;  $1.8 \leq w \leq 2.2$ ) **cathodes** containing  $\text{Li}_2\text{O}$ ,  $\text{LiOH}$ ,  $\text{LiNO}_3$ ,  $\text{Li}_2\text{CO}_3$ ,  $\text{Li}$  halides,  $\text{Li}_2\text{S}$ ,  $\text{Li}$  acetate, and/or  $\text{Li}_2\text{SO}_4$ , preferably at 3-30 mol (calculated as  $\text{Li}$ )/100 mol  $I$ .

IT 554-13-2, **Lithium carbonate 12057-24-8**,  
 Lithium oxide, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (lithium compound additives for  
 mixed oxide **cathodes** in secondary  
 lithium batteries)

RN 554-13-2 HCAPLUS

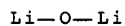
CN Carbonic acid, lithium salt (1:2) (CA INDEX NAME)



●2 Li

RN 12057-24-8 HCAPLUS

CN Lithium oxide ( $\text{Li}_2\text{O}$ ) (CA INDEX NAME)



IC ICM H01M004-58  
 ICS H01M004-02; H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST lithium battery oxide **cathode**  
 additive; oxide **cathode lithium compd**  
 additive

IT Cathodes  
 (battery, lithium compound)

- additives for mixed oxide cathodes in secondary lithium batteries)
- IT 116327-69-6P, Cobalt lithium nickel oxide (Co<sub>0.1</sub>LiNi<sub>0.902</sub>)  
 RL: DEV (Device component use); PNU (Preparation, unclassified); PRP (Properties); PREP (Preparation); USES (Uses)  
 (lithium compound additives for mixed oxide cathodes in secondary lithium batteries)
- IT 159845-85-9, Cobalt lithium nickel oxide (Co<sub>0-0.5</sub>Li<sub>0-1.3</sub>Ni<sub>0.5-101.8-2.2</sub>)  
 RL: DEV (Device component use); PRP (Properties); USES (Uses)  
 (lithium compound additives for mixed oxide cathodes in secondary lithium batteries)
- IT 546-89-4, Lithium acetate 554-13-2, Lithium carbonate 1310-65-2, Lithium hydroxide 7790-69-4, Lithium nitrate 10377-48-7, Lithium sulfate 12057-24-8, Lithium oxide, uses 12136-58-2, Lithium sulfide  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (lithium compound additives for mixed oxide cathodes in secondary lithium batteries)

=> d 149 ibib abs hitstr hitind 1-17

L49 ANSWER 1 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2004:575192 HCAPLUS Full-text

DOCUMENT NUMBER: 141:382000

TITLE: Preparation of porous, chemically cross-linked, PVdF-based gel polymer electrolytes for rechargeable lithium batteries

AUTHOR(S): Cheng, C. L.; Wan, C. C.; Wang, Y. Y.

CORPORATE SOURCE: Department of Chemical Engineering, National Tsing-Hua University, Hsinchu, 300, Taiwan

SOURCE: Journal of Power Sources (2004), 134(2), 202-210  
 CODEN: JPSODZ; ISSN: 0378-7753

PUBLISHER: Elsevier

DOCUMENT TYPE: Journal

LANGUAGE: English

AB This study reports the development of a new system of porous, chemical cross-linked, gel polymer electrolytes based on poly(vinylidene fluoride-co-hexafluoropropylene) (PVdF-HFP) copolymer as a polymer matrix, polyethylene glycol (PEG) as a **plasticizer**, and polyethylene glycol dimethacrylate (PEGDMA) as a chemical crosslinking oligomer. The electrolytes are prepared by a **combination** of controlled evaporation and thermal polymerization of PEGDMA. PVdF-HFP/PEG/PEGDMA gel polymer electrolytes with a **composition** of 5/3/2 exhibit both high ambient ionic conductivity, viz., >1 mS cm<sup>-1</sup>, and a high tensile modulus of 52 MPa, because of their porous and network structures. All the **blends** of electrolytes are electrochem. stable up to 5 V vs. Li/Li<sup>+</sup> in the presence of 1 M LiPF<sub>6</sub>/ethylene carbonate-diethyl carbonate (EC-DEC). With these polymer electrolytes, rechargeable lithium batteries composed of **carbon** anode and LiCoO<sub>2</sub> **cathode** have acceptable cycleability and a good rate capability.

IT 9011-17-0, Kynar 2801

RL: DEV (Device component use); RCT (Reactant); RACT (Reactant or reagent); USES (Uses)

(binder for electrode **composites**; preparation of porous, chemical cross-linked, PVdF-based gel polymer electrolytes for



rechargeable lithium batteries)

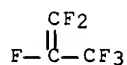
RN 9011-17-0 HCAPLUS

CN 1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with 1,1-difluoroethene  
(CA INDEX NAME)

CM 1

CRN 116-15-4

CMF C3 F6



CM 2

CRN 75-38-7

CMF C2 H2 F2



IT 12190-79-3, Cobalt lithium oxide (CoLiO<sub>2</sub>)

RL: DEV (Device component use); USES (Uses)

(cathode composite with Kynar and acetylene

black; preparation of porous, chemical cross-linked, PVdF-based gel  
polymer electrolytes for rechargeable lithium batteries)

RN 12190-79-3 HCAPLUS

CN Cobalt lithium oxide (CoLiO<sub>2</sub>) (CA INDEX NAME)

| Component | Ratio | Component<br>Registry Number |
|-----------|-------|------------------------------|
| =====     | ===== | =====                        |
| O         | 2     | 17778-80-2                   |
| Co        | 1     | 7440-48-4                    |
| Li        | 1     | 7439-93-2                    |

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 35, 38, 76

IT Carbon black, uses

RL: DEV (Device component use); TEM (Technical or engineered  
material use); USES (Uses)

(cathode composite with Kynar and LiCoO<sub>2</sub>;

preparation of porous, chemical cross-linked, PVdF-based gel polymer  
electrolytes for rechargeable lithium batteries)

IT 7440-44-0, Super P, uses

RL: DEV (Device component use); TEM (Technical or engineered  
material use); USES (Uses)

(activated (Super P), and MCMB 1028, anode composites

with Kynar; preparation of porous, chemical cross-linked, PVdF-based gel  
polymer electrolytes for rechargeable lithium batteries)

IT 9011-17-0, Kynar 2801

RL: DEV (Device component use); RCT (Reactant); RACT (Reactant or  
reagent); USES (Uses)

(binder for electrode **composites**; preparation of porous, chemical cross-linked, PVdF-based gel polymer electrolytes for rechargeable lithium batteries)

IT 12190-79-3, Cobalt lithium oxide (CoLiO<sub>2</sub>)

RL: DEV (Device component use); USES (Uses)

(**cathode composite** with Kynar and acetylene

black; preparation of porous, chemical cross-linked, PVdF-based gel polymer electrolytes for rechargeable lithium batteries)

IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate

RL: DEV (Device component use); USES (Uses)

(gel **composites** with carbonates/lithium salts/; preparation of porous, chemical cross-linked, PVdF-based gel polymer electrolytes for rechargeable lithium batteries)

REFERENCE COUNT: 43 THERE ARE 43 CITED REFERENCES AVAILABLE  
FOR THIS RECORD. ALL CITATIONS AVAILABLE  
IN THE RE FORMAT

L49 ANSWER 2 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2003:610813 HCAPLUS Full-text

DOCUMENT NUMBER: 139:152337

TITLE: Method for manufacture of electrochemical cell  
including a separation membrane with porous  
polymer membrane and a separation membrane  
support

INVENTOR(S): Hong, Jin-Young; Kang, Hyo-Rang

PATENT ASSIGNEE(S): Newturn Energy Co., Ltd., S. Korea

SOURCE: PCT Int. Appl., 41 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

| PATENT NO.  | KIND | DATE     | APPLICATION NO.  | DATE     |
|---|------|----------|------------------|----------|
| -----   | ---- | -----    | -----            |          |
| WO 2003065481   | A1   | 20030807 | WO 2002-KR310    | 20020226 |
| W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH,<br>CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD,<br>GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KZ, LC,<br>LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO,<br>NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM,<br>TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW<br>RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ,<br>BY, KG, KZ, MD, RU, TJ, TM, AT, BE, CH, CY, DE, DK, ES, FI,<br>FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG,<br>CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG |      |          |                  |          |
| KR 2003065074   | A    | 20030806 | KR 2002-5226     | 20020129 |
| TW 540174   | B    | 20030701 | TW 2002-91104502 | 20020311 |
| PRIORITY APPLN. INFO.:  |      |          |                  | 20020129 |
| KR 2002-5226  |      |          |                  | A        |

AB Disclosed are an electrochem. cell having excellent characteristics of impregnation with electrolytic solution and a method for manufacturing the same. The cell includes an anode, a **cathode** and polymer separation membrane installed between an anode and a **cathode** through polymer binder membrane. The polymer separation membrane is manufactured by forming polymer membrane including polyvinylidene-based polymer onto the supporting body of separation membrane. After extracting process of **plasticizer**, compressing process is implemented, so that **plasticizer** can be eliminated completely. Also, the polymer membrane is thin, so that non-uniformity of the manufacturing process is minimized. The polymer binder having a good adhesiveness is used, so that the attachment between electrode and separation membrane is practicable even at a low temperature Addnl., since binding is a spot binding, a cell having good characteristics of impregnation with an electrolytic solution and a good performance is provided.

IT 12190-79-3, Cobalt lithium oxide colio2

RL: DEV (Device component use); USES (Uses)

(method for manufacture of electrochem. cell including separation membrane with porous polymer membrane and separation membrane support)

RN 12190-79-3 HCAPLUS

CN Cobalt lithium oxide (CoLiO2) (CA INDEX NAME)

| Component | Ratio | Component<br>Registry Number |
|-----------|-------|------------------------------|
| =====     | ===== | =====                        |
| O         | 2     | 17778-80-2                   |
| Co        | 1     | 7440-48-4                    |
| Li        | 1     | 7439-93-2                    |

IT 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer

RL: TEM (Technical or engineered material use); USES (Uses)

(support; method for manufacture of electrochem. cell including separation membrane with porous polymer membrane and separation membrane support)

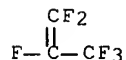
RN 9011-17-0 HCAPLUS

CN 1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with 1,1-difluoroethene  
(CA INDEX NAME)

CM 1

CRN 116-15-4

CMF C3 F6



CM 2

CRN 75-38-7

CMF C2 H2 F2



IC ICM H01M002-16

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 38, 39, 72

IT 7440-44-0, **Carbon**, uses  
 RL: DEV (Device component use); USES (Uses)  
 (mesocarbon microbeads; method for manufacture of electrochem. cell  
 including separation membrane with porous polymer membrane and separation  
 membrane support)

IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate  
 616-38-6, Dimethyl carbonate 12190-79-3, Cobalt lithium  
 oxide colio2 21324-40-3, Lithium hexafluorophosphate  
 324745-49-5, TF 4035  
 RL: DEV (Device component use); USES (Uses)  
 (method for manufacture of electrochem. cell including separation membrane  
 with porous polymer membrane and separation membrane support)

IT 84-74-2, Dibutylphthalate 627-93-0, Dimethyl adipate  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (**plasticizer**; method for manufacture of electrochem. cell  
 including separation membrane with porous polymer membrane and separation  
 membrane support)

IT 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer  
 25038-59-9, Mylar, uses  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (support; method for manufacture of electrochem. cell including separation  
 membrane with porous polymer membrane and separation membrane support)

REFERENCE COUNT: 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR  
 THIS RECORD. ALL CITATIONS AVAILABLE IN  
 THE RE FORMAT

L49 ANSWER 3 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2002:811781 HCAPLUS Full-text

DOCUMENT NUMBER: 137:327379

TITLE: Continuous production of trilaminates by  
 coextrusion for polymer lithium batteries

INVENTOR(S): Naarmann, Herbert; Kruger, Franz Josef;  
 Schaefer, Tim

PATENT ASSIGNEE(S): Dilo Trading A.-G., Switz.

SOURCE: Ger. Offen., 10 pp.  
 CODEN: GWXXBX

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

| PATENT NO.             | KIND | DATE     | APPLICATION NO.  | DATE         |
|------------------------|------|----------|------------------|--------------|
| -----                  | ---- | -----    | -----            |              |
| DE 10118639            | A1   | 20021024 | DE 2001-10118639 | 200104<br>12 |
| DE 10118639            | B4   | 20070614 |                  |              |
| PRIORITY APPLN. INFO.: |      |          | DE 2001-10118639 | 200104<br>12 |

AB The invention concerns the production of Trilamainates, consisting of an anode  
**composite**, polymer electrolytes and a **cathode composite**, which are provided on  
 the **cathode** side and on the anode side with a metallic grid. The production is  
 carried out continuously, preferably via coextrusion. The systems thus  
 obtained form the basis for rechargeable polymer lithium batteries. The  
 procedure according to invention contains the production of anode masses,

cathode material as well as the polymer gel electrolyte, which are: (1) homogeneously developed, (2) agree in structural viscosity and rheol., and (3) defined in shape by extrusion; and can be continuously formed as bands with reproducible wts. and laminated. The anode mass consists of graphite, preferably synthetic, e.g., mesocarbon microbeads with spherical particles or graphite fibers as well as a polymer binder e.g. polyfluoroelastomeres, polyolefins, polybutadiene or styrene copolymers, as well as polymethacrylates with alc. residues C4-C20, and polyvinyl compds. such as polyvinylpyrrolidone, polyvinylimidazole, polyvinylpyridin etc. and their copolymers, e.g. with methacrylic acid ester with alc. residues C4-C20, and a conducting salt e.g., LiPF6 or Li oxalato borates, etc.

IT 12190-79-3, Cobalt lithium oxide colio2  
 RL: DEV (Device component use); USES (Uses)  
 (continuous production of trilaminates by coextrusion for polymer lithium batteries)  
 RN 12190-79-3 HCAPLUS  
 CN Cobalt lithium oxide (CoLiO2) (CA INDEX NAME)

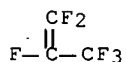
| Component | Ratio | Component<br>Registry Number |
|-----------|-------|------------------------------|
| =====     | ===== | =====                        |
| O         | 2     | 17778-80-2                   |
| Co        | 1     | 7440-48-4                    |
| Li        | 1     | 7439-93-2                    |

IT 9011-17-0, Kynar 2801  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (continuous production of trilaminates by coextrusion for polymer lithium batteries)  
 RN 9011-17-0 HCAPLUS  
 CN 1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with 1,1-difluoroethene  
 (CA INDEX NAME)

CM 1

CRN 116-15-4

CMF C3 F6



CM 2

CRN 75-38-7

CMF C2 H2 F2



IC ICM H01M010-38  
 ICS H01M010-40  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 38

IT Battery anodes  
Battery **cathodes**  
Extrusion of plastics and rubbers  
Laminated materials  
(continuous production of trilaminates by coextrusion for polymer lithium batteries)

IT **Carbon** fibers, uses  
RL: DEV (Device component use); USES (Uses)  
(graphite; continuous production of trilaminates by coextrusion for polymer lithium batteries)

IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate 7782-42-5, Graphite, uses 7791-03-9, Lithium perchlorate 9003-17-2, Polybutadiene 9003-39-8, Polyvinylpyrrolidone 9003-47-8, Polyvinylpyridine 9003-53-6, Polystyrene 12031-65-1, Lithium nickel oxide linio2 12057-17-9, Lithium manganese oxide limn2o4 12190-79-3, Cobalt lithium oxide colio2 14283-07-9, Lithium tetrafluoroborate 21324-40-3, Lithium hexafluorophosphate 25087-26-7D, Polymethacrylic acid, alkyl esters, with C4-20 alcs. 25232-42-2, Polyvinylimidazole 33454-82-9, Lithium triflate 37296-91-6, Lithium molybdenum oxide 37349-20-5, Lithium tungsten oxide 39302-37-9, Lithium titanium oxide 473540-08-8  
RL: DEV (Device component use); USES (Uses)  
(continuous production of trilaminates by coextrusion for polymer lithium batteries)

IT 7631-86-9, Silica, uses 9011-17-0, Kynar 2801  
RL: MOA (Modifier or additive use); USES (Uses)  
(continuous production of trilaminates by coextrusion for polymer lithium batteries)

IT 7440-44-0, **Carbon**, uses  
RL: DEV (Device component use); USES (Uses)  
(mesocarbon microbeads; continuous production of trilaminates by coextrusion for polymer lithium batteries)

REFERENCE COUNT: 1 THERE ARE 1 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L49 ANSWER 4 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN  
ACCESSION NUMBER: 2002:793988 HCAPLUS Full-text  
DOCUMENT NUMBER: 137:297441  
TITLE: Fabrication of secondary batteries comprising polymer binders  
INVENTOR(S): Coulon, Michel; Silvert, Pierre-Yves; Irissin-Mangata, Josiane; Ameduri, Bruno  
PATENT ASSIGNEE(S): Le Carbone Lorraine, Fr.  
SOURCE: PCT Int. Appl., 23 pp.  
CODEN: PIXXD2  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

| PATENT NO.    | KIND | DATE     | APPLICATION NO. | DATE     |
|---------------|------|----------|-----------------|----------|
| -----         | ---- | -----    | -----           |          |
| WO 2002082571 | A1   | 20021017 | WO 2001-EP4291  | 20010403 |

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE,

GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,  
 LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO,  
 NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT,  
 TZ, UA, UG, US, UZ, VN, YU, ZA, ZW  
 RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH,  
 CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE,  
 TR, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD,  
 TG

AU 2001250424 A1 20021021 AU 2001-250424 200104  
 03

WO 2002101865 A2 20021219 WO 2002-EP5209 200203  
 28

WO 2002101865 A3 20040408  
 W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH,  
 CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD,  
 GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ,  
 LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ,  
 NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ,  
 TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW  
 RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ,  
 BY, KG, KZ, MD, RU, TJ, TM, AT, BE, CH, CY, DE, DK, ES, FI,  
 FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG,  
 CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG  
 AU 2002325211 A1 20021223 AU 2002-325211

200203  
 28

PRIORITY APPLN. INFO.:

WO 2001-EP4291 W

200104  
 03

WO 2002-EP5209 W

200203  
 28

AB The present invention is a polymer alkaline ion electrochem. cell with improved thermal and chemical stability and a method for making the same. The cell of the invention comprises a pos. collector, a neg. collector, a pos. electrode, a neg. electrode, a separator and an electrolyte, the separator comprising a binder and filler, each of the electrodes comprising a binder, and is characterized in that at least one of the binders is a VDF/HFP copolymer which has been made insol. in the electrolyte by a heat treatment. In a preferred embodiment, the copolymer is made insol. by crosslinking.

IT 12190-79-3, Cobalt lithium oxide colio2

RL: DEV (Device component use); USES (Uses)

(fabrication of secondary batteries comprising polymer binders)

RN 12190-79-3 HCAPLUS

CN Cobalt lithium oxide (CoLiO2) (CA INDEX NAME)

| Component | Ratio | Component<br>Registry Number |
|-----------|-------|------------------------------|
| O         | 2     | 17778-80-2                   |
| Co        | 1     | 7440-48-4                    |
| Li        | 1     | 7439-93-2                    |

IT 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer

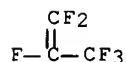
RL: MOA (Modifier or additive use); USES (Uses)

(fabrication of secondary batteries comprising polymer binders)

RN 9011-17-0 HCAPLUS  
 CN 1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with 1,1-difluoroethene  
 (CA INDEX NAME)

CM 1

CRN 116-15-4  
 CMF C3 F6



CM 2

CRN 75-38-7  
 CMF C2 H2 F2



IC ICM H01M004-62  
 ICS H01M010-40  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 38, 72  
 IT **Carbon** black, uses  
 RL: DEV (Device component use); USES (Uses)  
 (fabrication of secondary batteries comprising polymer binders)  
 IT 96-48-0,  $\gamma$ -Butyrolactone 616-38-6, Dimethyl carbonate  
 7782-42-5, Graphite, uses 12190-79-3, Cobalt lithium oxide  
 colio2 21324-40-3, Lithium hexafluorophosphate  
 RL: DEV (Device component use); USES (Uses)  
 (fabrication of secondary batteries comprising polymer binders)  
 IT 1309-48-4, Magnesia, uses 9011-14-7, Pmma 9011-17-0,  
 Hexafluoropropylene-vinylidene fluoride copolymer  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (fabrication of secondary batteries comprising polymer binders)  
 IT 84-74-2, Dibutyl phthalate 108-32-7, Propylene carbonate  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (**plasticizer**; fabrication of secondary batteries  
 comprising polymer binders)  
 REFERENCE COUNT: 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR  
 THIS RECORD. ALL CITATIONS AVAILABLE IN  
 THE RE FORMAT

L49 ANSWER 5 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN  
 ACCESSION NUMBER: 2002:591812 HCAPLUS Full-text  
 DOCUMENT NUMBER: 137:127621  
 TITLE: Process for fabrication electrode foils for  
 batteries  
 INVENTOR(S): Haug, Peter; Birke, Peter; Holl, Konrad; Ilic,  
 Dejan  
 PATENT ASSIGNEE(S): Microbatterie Gmbh, Germany; Varta Microbattery



SOURCE: GmbH  
Eur. Pat. Appl., 8 pp.  
CODEN: EPXXDW  
DOCUMENT TYPE: Patent  
LANGUAGE: German  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

| PATENT NO.  | KIND | DATE     | APPLICATION NO.  | DATE               |
|---|------|----------|------------------|--------------------|
| EP 1229597  | A2   | 20020807 | EP 2001-127808   | 20011122           |
| EP 1229597  | A3   | 20040428 |                  |                    |
| R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR |      |          |                  |                    |
| DE 10104988   | A1   | 20020808 | DE 2001-10104988 | 20010203           |
| JP 2002289197   | A    | 20021004 | JP 2002-24157    | 20020131           |
| US 2002119371   | A1   | 20020829 | US 2002-61643    | 20020201           |
| CN 1369923  | A    | 20020918 | CN 2002-103349   | 20020201           |
| PRIORITY APPLN. INFO.:  |      |          |                  | DE 2001-10104988 A |
|   |      |          |                  | 20010203           |

AB In a wet chemical process for batteries, which contain  $\geq 1$  Li intercalating electrode, which contains a mixture of  $\geq 2$  fluorinated polymers, in which polymer matrix is finely dispersed in polymer-insol. electrochem. active material;  $\geq 2$  fluoropolymers are dissolved in a solvent and without addition of plasticizer, swelling agent, or electrolyte, but with a highly conducting soot, whose BET surface area lies between that of surface minimized graphite and activated C. The electrochem. active material has a 2-dimensional layer structure and an electronic conductivity of  $\leq 10^{-4}$  S/cm, in which Li reversibly intercalates and deintercalates. The pasty mass thus obtained is applied on an electrode grid or a support film and dried. The anode and cathode films so obtained are laminated to a separator, the stack is soaked with liquid organic electrolyte to form a battery.

IT 12190-79-3, Cobalt lithium oxide colio2  
RL: DEV (Device component use); USES (Uses)  
(process for fabrication electrode foils for batteries)

RN 12190-79-3 HCAPLUS

CN Cobalt lithium oxide (CoLiO2) (CA INDEX NAME)

| Component | Ratio | Component Registry Number |
|-----------|-------|---------------------------|
| O         | 2     | 17778-80-2                |
| Co        | 1     | 7440-48-4                 |
| Li        | 1     | 7439-93-2                 |

IT 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer

RL: MOA (Modifier or additive use); USES (Uses)  
 (process for fabrication electrode foils for batteries)

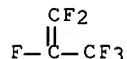
RN 9011-17-0 HCAPLUS

CN 1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with 1,1-difluoroethene  
 (CA INDEX NAME)

CM 1

CRN 116-15-4

CMF C3 F6



CM 2

CRN 75-38-7

CMF C2 H2 F2



IC ICM H01M004-04

ICS H01M004-62; H01M004-02; H01M004-52

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

IT Battery anodes

Battery **cathodes**

Soot

(process for fabrication electrode foils for batteries)

IT Graphitized **carbon** black

RL: DEV (Device component use); USES (Uses)

(process for fabrication electrode foils for batteries)

IT 12190-79-3, Cobalt lithium oxide colio2

RL: DEV (Device component use); USES (Uses)

(process for fabrication electrode foils for batteries)

IT 872-50-4, n-Methyl-2-pyrrolidone, uses 9011-17-0,

Hexafluoropropylene-vinylidene fluoride copolymer

RL: MOA (Modifier or additive use); USES (Uses)

(process for fabrication electrode foils for batteries)

L49 ANSWER 6 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2002:585692 HCAPLUS Full-text

DOCUMENT NUMBER: 137:111643

TITLE: Method for manufacture of gel polymer  
 electrolyte separator for laminated lithium ion  
 batteries

INVENTOR(S): Lin, Yunqing; Ge, Shao; Sun, Shuhua

PATENT ASSIGNEE(S): Jida Chaoyue S & T Development Co., Ltd., Peop.  
 Rep. China

SOURCE: Faming Zhuanli Shenqing Gongkai Shuomingshu, 12  
 pp.

CODEN: CNXXEV

DOCUMENT TYPE: Patent

LANGUAGE: Chinese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

| PATENT NO.             | KIND | DATE     | APPLICATION NO. | DATE     |
|------------------------|------|----------|-----------------|----------|
| CN 1310483             | A    | 20010829 | CN 2001-108824  | 20010220 |
| PRIORITY APPLN. INFO.: |      |          |                 | 20010220 |
|                        |      |          |                 | 20010109 |

AB The separator, 25-80  $\Phi$ mm thick, is manufactured by dissolving hexafluoropropylene-vinylidene fluoride copolymer and **plasticizer** such as DBP in an organic solvent at 50° C, adding inorg. filler (nanometer SiO<sub>2</sub>, pretreated with dispersing agent) in forms of slurry of acetone or butanone to the polymer solution, cooling to 30.degree.C, and forming a film by coating. The **pos. electrode** film is manufactured by preparing a slurry containing LiCoO<sub>2</sub> (or LiNiO<sub>2</sub>, LiMn<sub>2</sub>O<sub>4</sub>), acetylene black, hexafluoropropylene-vinylidene fluoride copolymer, DBP, and a dispersing agent, coating the slurry on a glass strip or a metal foil, and drying at 30- 60.degree.C. The neg. electrode film is manufactured by preparing a slurry containing carbonaceous material (MCMB) powder, acetylene black, hexafluoropropylene-vinylidene fluoride copolymer, DBP, and a dispersing agent (e.g., OP-10), coating the slurry on a glass strip or a metal foil, and drying at 30-60.degree.C. The laminated battery is manufactured by laminating an Al network (pos. current collector), the **pos. electrode** film, the separator, the neg. electrode film, and a Cu network by hot pressing at 130-135.degree.C to form a battery unit, making a stack of the battery units, hot pressing, removing DBP with a petroleum ether having a b.p. 90- 120.degree.C or methanol, drying, and introducing an liquid electrolyte into the battery stack.

IT 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer  
 12190-79-3, Cobalt lithium oxide (LiCoO<sub>2</sub>)  
 RL: CPS (Chemical process); DEV (Device component use); PEP  
 (Physical, engineering or chemical process); PROC (Process); USES  
 (Uses)

(gel polymer electrolyte separator and electrode films for  
 laminated lithium ion batteries)

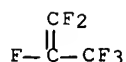
RN 9011-17-0 HCAPLUS

CN 1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with 1,1-difluoroethene  
 (CA INDEX NAME)

CM 1

CRN 116-15-4

CMF C3 F6



CM 2

CRN 75-38-7

CMF C2 H2 F2



RN 12190-79-3 HCAPLUS

CN Cobalt lithium oxide (CoLiO2) (CA INDEX NAME)

| Component | Ratio | Component<br>Registry Number |
|-----------|-------|------------------------------|
| O         | 2     | 17778-80-2                   |
| Co        | 1     | 7440-48-4                    |
| Li        | 1     | 7439-93-2                    |

IC ICM H01M002-14

ICS H01M002-16; H01M010-38

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38

IT Battery anodes

Battery **cathodes**

Films

Secondary battery separators

(gel polymer electrolyte separator and electrode films for  
laminated lithium ion batteries)IT **Carbon** black, uses

Carbonaceous materials (technological products)

RL: CPS (Chemical process); DEV (Device component use); PEP

(Physical, engineering or chemical process); PROC (Process); USES  
(Uses)(gel polymer electrolyte separator and electrode films for  
laminated lithium ion batteries)IT 7631-86-9, Silica, uses 9011-17-0, Hexafluoropropylene-  
vinylidene fluoride copolymer 12031-65-1, Lithium nickel oxide  
(LiNiO2) 12057-17-9, Lithium manganese oxide (LiMn2O4)  
12190-79-3, Cobalt lithium oxide (LiCoO2)

RL: CPS (Chemical process); DEV (Device component use); PEP

(Physical, engineering or chemical process); PROC (Process); USES  
(Uses)(gel polymer electrolyte separator and electrode films for  
laminated lithium ion batteries)

L49 ANSWER 7 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2001:731230 HCAPLUS Full-text

DOCUMENT NUMBER: 135:275380

TITLE: Method of making bonded-electrode rechargeable  
batteries and supercapacitors

INVENTOR(S): Gozdz, Antoni S.; Tarascon, Jean-Marie

PATENT ASSIGNEE(S): Valence Technology, Inc., USA

SOURCE: PCT Int. Appl., 29 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 2

## PATENT INFORMATION:

| PATENT NO.<br>-----   | KIND<br>--- | DATE<br>----- | APPLICATION NO.<br>----- | DATE               |
|---|-------------|---------------|--------------------------|--------------------|
| WO 2001073871   | A2          | 20011004      | WO 2001-US9491           | 200103<br>23       |
| WO 2001073871   | A3          | 20020627      |                          |                    |
| W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH,<br>CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE,<br>GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,<br>LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO,<br>NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT,<br>TZ, UA, UG, UZ, VN, YU, ZA, ZW<br>RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH,<br>CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE,<br>TR, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD,<br>TG |             |               |                          |                    |
| US 6391069  | B1          | 20020521      | US 2000-538575           | 200003<br>29       |
| CA 2405017  | A1          | 20011004      | CA 2001-2405017          | 200103<br>23       |
| EP 1269560  | A2          | 20030102      | EP 2001-920726           | 200103<br>23       |
| R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC,<br>PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR  |             |               |                          |                    |
| JP 2003530663   | T           | 20031014      | JP 2001-571493           | 200103<br>23       |
| TW 496007   | B           | 20020721      | TW 2001-90107388         | 200105<br>02       |
| US 2002110728   | A1          | 20020815      | US 2002-115697           | 200204<br>03       |
| IN 2002CN01532  | A           | 20050128      | IN 2002-CN1532           | 200209<br>24       |
| PRIORITY APPLN. INFO.:  |             |               | US 2000-538575           | A<br>200003<br>29  |
|   |             |               | US 2000-538574           | A1<br>200003<br>29 |
|   |             |               | WO 2001-US9491           | W<br>200103<br>23  |

AB A Li-ion battery cell comprising a polymeric matrix **pos. electrode** layer member, a polymeric matrix neg. electrode layer member, and an interposed microporous polyolefin separator layer member is laminated into a unitary, flexible cell structure by means of heat and pressure without necessity for applied interlayer adhesive. A primary **plasticizer** for the electrode member matrix polymer is included in the electrode layer **compsns.** During the

lamination operation, which may be carried out at a moderate-temperature that does not compromise the thermal shutdown capability of the microporous separator, the **plasticizer** softens the polymer into a thermoplastic adhesive which forms an effective bond to the untreated polyolefin surface in the region of the electrode/separator interface. The **plasticizer** dissipates from the **composition** along with residual lamination heat or may be extracted with solvent or supercrit. fluid, thereby enabling the electrode polymer alone to form a strong, permanent bond to the polyolefin separator member.

IT 12190-79-3, cobalt lithium oxide colio2

RL: DEV (Device component use); USES (Uses)

(method of making bonded-electrode rechargeable batteries and supercapacitors)

RN 12190-79-3 HCAPLUS

CN Cobalt lithium oxide (CoLiO2) (CA INDEX NAME)

| Component | Ratio | Component<br>Registry Number |
|-----------|-------|------------------------------|
| =====     | ===== | =====                        |
| O         | 2     | 17778-80-2                   |
| Co        | 1     | 7440-48-4                    |
| Li        | 1     | 7439-93-2                    |

IT 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer

RL: TEM (Technical or engineered material use); USES (Uses)

(method of making bonded-electrode rechargeable batteries and supercapacitors)

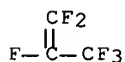
RN 9011-17-0 HCAPLUS

CN 1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with 1,1-difluoroethene  
(CA INDEX NAME)

CM 1

CRN 116-15-4

CMF C3 F6



CM 2

CRN 75-38-7

CMF C2 H2 F2



IC ICM H01M004-00

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 76

IT Polyoxyalkylenes, uses

RL: MOA (Modifier or additive use); USES (Uses)

(ethers, **plasticizer**; method of making bonded-electrode rechargeable batteries and supercapacitors)

- IT Battery anodes  
Battery cathodes  
Evaporation  
Plasticizers  
(method of making bonded-electrode rechargeable batteries and supercapacitors)
- IT 12190-79-3, cobalt lithium oxide colio2  
RL: DEV (Device component use); USES (Uses)  
(method of making bonded-electrode rechargeable batteries and supercapacitors)
- IT 7440-44-0, Carbon, uses 7782-42-5, Graphite, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(method of making bonded-electrode rechargeable batteries and supercapacitors)
- IT 9002-85-1, Polyvinylidene chloride 9002-86-2, Pvc 9011-14-7, Pmma 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer 24937-79-9, PvdF 25014-41-9, Polyacrylonitrile 25322-68-3, Peo  
RL: TEM (Technical or engineered material use); USES (Uses)  
(method of making bonded-electrode rechargeable batteries and supercapacitors)
- IT 21324-40-3, Lithium hexafluorophosphate  
RL: DEV (Device component use); USES (Uses)  
(plasticizer; method of making bonded-electrode rechargeable batteries and supercapacitors)
- IT 88-99-3D, Phthalic acid, dialkyl derivative 108-32-7, Propylene carbonate 110-15-6D, Succinic acid, dialkyl derivative 111-20-6D, Sebacic acid, dialkyl derivative 124-04-9, Adipic acid, uses 463-79-6D, Carbonic acid, alkylene derivative, uses 7664-38-2D, Phosphoric acid, trialkyl derivative, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(plasticizer; method of making bonded-electrode rechargeable batteries and supercapacitors)

L49 ANSWER 8 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN  
ACCESSION NUMBER: 2001:731225 HCAPLUS Full-text  
DOCUMENT NUMBER: 135:259894  
TITLE: Flat, bonded-electrode rechargeable electrochemical cell devices such as rechargeable batteries and supercapacitors  
INVENTOR(S): Gozdz, Antoni S.  
PATENT ASSIGNEE(S): Valence Technology, Inc., USA; Valence Technology Nevada, Inc.  
SOURCE: PCT Int. Appl., 30 pp.  
CODEN: PIXXD2  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 2  
PATENT INFORMATION:

| PATENT NO.    | KIND | DATE     | APPLICATION NO. | DATE         |
|---------------|------|----------|-----------------|--------------|
| -----         | ---- | -----    | -----           |              |
| WO 2001073863 | A2   | 20011004 | WO 2001-US9004  | 200103<br>21 |

WO 2001073863 A3 20020906

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,

LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO,  
 NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT,  
 TZ, UA, UG, UZ, VN, YU, ZA, ZW  
 RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH,  
 CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE,  
 TR, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD,  
 TG

|  |    |          |                  |                    |
|--|----|----------|------------------|--------------------|
| CA 2404507   | A1 | 20011004 | CA 2001-2404507  | 200103<br>21       |
| AU 200147638   | A  | 20011008 | AU 2001-47638    | 200103<br>21       |
| EP 1269559   | A2 | 20030102 | EP 2001-920604   | 200103<br>21       |
| R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC,<br>PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR |    |          |                  |                    |
| JP 2003530662  | T  | 20031014 | JP 2001-571485   | 200103<br>21       |
| TW 531918  | B  | 20030511 | TW 2001-90107400 | 200105<br>02       |
| US 2002110728  | A1 | 20020815 | US 2002-115697   | 200204<br>03       |
| IN 2002CN01531   | A  | 20050128 | IN 2002-CN1531   | 200209<br>24       |
| PRIORITY APPLN. INFO.:   |    |          | US 2000-538574   | A<br>200003<br>29  |
|  |    |          | US 2000-538575   | A1<br>200003<br>29 |
|  |    |          | WO 2001-US9004   | W<br>200103<br>21  |

AB A Li-ion battery cell comprising a polymeric matrix **pos. electrode** layer member, a polymeric matrix neg. electrode layer member, and an interposed microporous polyolefin separator layer member is laminated into a unitary, flexible cell structure by means of heat and pressure without necessity of applied interlayer adhesive. A volatile vehicle solution of a primary **plasticizer** for the electrode member polymer matrix is applied to the microporous separator member where it is absorbed into the porous structure. Evaporation of the volatile vehicle solvent deposits the **plasticizer** upon and within the pores of the separator member. During the lamination operation the **plasticizer** is forced into contact with the electrode member polymer where it softens the polymer into a thermoplastic adhesive in the region of the electrode/separator interface, thereby enabling the electrode polymer alone to form a strong bond to the separator upon cooling.

IT 12190-79-3, cobalt lithium oxide colio2

RL: DEV (Device component use); USES (Uses)

(flat bonded-electrode rechargeable electrochem. cell devices  
 such as rechargeable batteries and supercapacitors)

RN 12190-79-3 HCAPLUS



CN Cobalt lithium oxide (CoLiO2) (CA INDEX NAME)

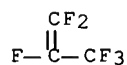
| Component | Ratio | Component<br>Registry Number |
|-----------|-------|------------------------------|
| =====     | ===== | =====                        |
| O         | 2     | 17778-80-2                   |
| Co        | 1     | 7440-48-4                    |
| Li        | 1     | 7439-93-2                    |

IT 9011-17-0, Hexafluoropropylene=vinylidene fluoride copolymer  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (flat bonded-electrode rechargeable electrochem. cell devices  
 such as rechargeable batteries and supercapacitors)  
 RN 9011-17-0 HCAPLUS  
 CN 1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with 1,1-difluoroethene  
 (CA INDEX NAME)

CM 1

CRN 116-15-4

CMF C3 F6



CM 2

CRN 75-38-7

CMF C2 H2 F2



IC ICM H01M  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 38, 76  
 IT Battery anodes  
 Battery **cathodes**  
 Battery electrodes  
 Capacitor electrodes  
**Plasticizers**  
 Secondary battery separators  
 Solvent extraction  
 (flat bonded-electrode rechargeable electrochem. cell devices  
 such as rechargeable batteries and supercapacitors)  
 IT 7429-90-5, Aluminum, uses 7782-42-5, Graphite, uses 9003-07-0  
 12190-79-3, cobalt lithium oxide colio2  
 RL: DEV (Device component use); USES (Uses)  
 (flat bonded-electrode rechargeable electrochem. cell devices  
 such as rechargeable batteries and supercapacitors)  
 IT 7440-44-0, **Carbon**, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (flat bonded-electrode rechargeable electrochem. cell devices

such as rechargeable batteries and supercapacitors)  
 IT 67-64-1, Acetone, uses 108-32-7, Propylene carbonate 9002-85-1,  
 Polyvinylidene chloride 9002-86-2, Polyvinyl chloride 9011-14-7,  
 Pmma 9011-17-0, Hexafluoropropylene=vinylidene fluoride  
 copolymer 24937-79-9, PvdF 25014-41-9, Polyacrylonitrile  
 25322-68-3, Peo  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (flat bonded-electrode rechargeable electrochem. cell devices  
 such as rechargeable batteries and supercapacitors)

L49 ANSWER 9 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN  
 ACCESSION NUMBER: 2001:635714 HCAPLUS Full-text  
 DOCUMENT NUMBER: 135:183329  
 TITLE: Manufacture of secondary nonaqueous electrolyte  
 batteries  
 INVENTOR(S): Kano, Koji; Iwahisa, Masahiro; Hibino, Seiji  
 PATENT ASSIGNEE(S): Toshiba Battery Co., Ltd., Japan  
 SOURCE: Jpn. Kokai Tokkyo Koho, 8 pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

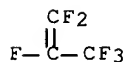
| PATENT NO.                           | KIND | DATE     | APPLICATION NO. | DATE         |
|--------------------------------------|------|----------|-----------------|--------------|
| -----                                | ---  | -----    | -----           |              |
| JP 2001236991                        | A    | 20010831 | JP 2000-43081   | 200002<br>21 |
| PRIORITY APPLN. INFO.: JP 2000-43081 |      |          |                 | 200002<br>21 |

AB The batteries are manufactured by using **cathode** and/or anode active slurries prepared by stirring a **mixture** containing an electrode active mass, a nonaq. electrolyte retaining binder, a **plasticizer**, and a solvent at a temperature  $\geq 40^\circ$  and below the bubble generating temperature of the **mixture**. The battery separators may also be manufactured by using a slurry containing an electrolyte retaining binder, a **plasticizer**, and a solvent prepared in a similar manner.

IT 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer  
 RL: DEV (Device component use); PEP (Physical, engineering or  
 chemical process); PROC (Process); USES (Uses)  
 (temperature control in preparation of electrode active mass slurries and  
 separator slurries for secondary lithium batteries)  
 RN 9011-17-0 HCAPLUS  
 CN 1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with 1,1-difluoroethene  
 (CA INDEX NAME)

CM 1

CRN 116-15-4  
 CMF C3 F6



CM 2

CRN 75-38-7

CMF C2 H2 F2



IT 12190-79-3, Cobalt lithium oxide (CoLiO<sub>2</sub>)  
 RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
 (temperature control in preparation of electrode active mass slurries for secondary lithium batteries)  
 RN 12190-79-3 HCAPLUS  
 CN Cobalt lithium oxide (CoLiO<sub>2</sub>) (CA INDEX NAME)

| Component | Ratio | Component<br>Registry Number |
|-----------|-------|------------------------------|
| O         | 2     | 17778-80-2                   |
| Co        | 1     | 7440-48-4                    |
| Li        | 1     | 7439-93-2                    |

IC ICM H01M010-40

ICS H01M004-02; H01M004-04

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

IT Carbon fibers, uses

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
 (temperature control in preparation of electrode active mass slurries for secondary lithium batteries)

IT 84-74-2, Dbp 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
 (temperature control in preparation of electrode active mass slurries and separator slurries for secondary lithium batteries)

IT 12190-79-3, Cobalt lithium oxide (CoLiO<sub>2</sub>)

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
 (temperature control in preparation of electrode active mass slurries for secondary lithium batteries)

L49 ANSWER 10 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2001:338909 HCAPLUS Full-text

DOCUMENT NUMBER: 134:355442

TITLE: Films for electrochemical components and method  
 for producing the same

INVENTOR(S): Birke, Peter; Salam, Fatima

PATENT ASSIGNEE(S): Fraunhofer-Gesellschaft zur Foerderung de  
 Angewandten Forschung e.V., Germany

SOURCE: PCT Int. Appl., 40 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 1

## PATENT INFORMATION:

| PATENT NO.  | KIND | DATE     | APPLICATION NO.  | DATE               |
|---|------|----------|------------------|--------------------|
| WO 2001033656   | A1   | 20010510 | WO 2000-EP10259  | 20001018           |
| W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW<br>RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG |      |          |                  |                    |
| DE 19952335   | A1   | 20010517 | DE 1999-19952335 | 19991029           |
| DE 19952335   | B4   | 20070329 |                  |                    |
| CA 2389153  | A1   | 20010510 | CA 2000-2389153  | 20001018           |
| BR 2000015072   | A    | 20020618 | BR 2000-15072    | 20001018           |
| EP 1230708  | A1   | 20020814 | EP 2000-975881   | 20001018           |
| EP 1230708  | B1   | 20071017 |                  |                    |
| R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL   |      |          |                  |                    |
| JP 2003513429   | T    | 20030408 | JP 2001-535249   | 20001018           |
| IN 2002KN00504  | A    | 20060210 | IN 2002-KN504    | 20020422           |
| PRIORITY APPLN. INFO.:  |      |          |                  | DE 1999-19952335 A |
|   |      |          |                  | 19991029           |
|   |      |          |                  | WO 2000-EP10259 W  |
|   |      |          |                  | 20001018           |

OTHER SOURCE(S): MARPAT 134:355442

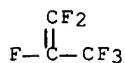
AB The invention relates to a paste-like **compns.** for use in electrochem. components. Said paste comprises a heterogeneous **mixture** from (1) a matrix (A) that comprises at least one organic polymer, the precursors thereof or the prepolymers thereof and a **plasticizer** or that consists of theses components and (2) an inorg. material in the form of a solid substance (B) that can be electrochem. activated and that is not soluble in the matrix and in water, with the proviso that the **mixture** does not contain a conductor that is soluble in the **plasticizer** and that is different from (B). The invention also relates to layers (films) and electrochem. interlaminar structures (for example electrochem. cells ). The **plasticizer** used is preferably at least one substance that carries AlDA2, wherein A1 and A2 may independently represent

R1, OR1, SR1 or NHR1, with R1 equal C1-C6 alkyl, or A1 and A2 together with D form a 5-membered heterocyclic ring and D may represent C:O, S:O, C:NH or C:CH2 and may also represent O, S, NH or CH2 if D together with A1 and A2 forms a 5-membered heterocyclic ring. The presence of the **plasticizer** provides thinner films with higher flexibility. A typical paste for a neg. film electrode contained Li4Ti5O12 5, acetylene black 1, ethylene carbonate 0.5, hexafluoropropylene- vinylidene fluoride copolymer 1.25, and Me2CO 50 g.

IT 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer  
 RL: DEV (Device component use); MOA (Modifier or additive use); TEM (Technical or engineered material use); USES (Uses)  
 (films with good flexibility and low thickness containing polymer binders and **plasticizers** for battery components)  
 RN 9011-17-0 HCAPLUS  
 CN 1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with 1,1-difluoroethene (CA INDEX NAME)

CM 1

CRN 116-15-4  
 CMF C3 F6



CM 2

CRN 75-38-7  
 CMF C2 H2 F2



IT 12190-79-3, Lithium cobalt oxide (LiCoO2)  
 RL: DEV (Device component use); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)  
 (films with good flexibility and low thickness containing polymer binders and **plasticizers** for battery components)  
 RN 12190-79-3 HCAPLUS  
 CN Cobalt lithium oxide (CoLiO2) (CA INDEX NAME)

| Component | Ratio | Component<br>Registry Number |
|-----------|-------|------------------------------|
| =====     | ===== | =====                        |
| O         | 2     | 17778-80-2                   |
| Co        | 1     | 7440-48-4                    |
| Li        | 1     | 7439-93-2                    |

IC ICM H01M010-40  
 ICS H01M004-62; H01M004-02  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST battery film anode **plasticized** polymer; lithium titanate  
 acetylene black film **cathode** battery; ethylene carbonate  
**plasticizer** fluoropolymer battery film **cathode**

- IT Carbon black, uses  
Metals, uses  
Nitrides  
RL: DEV (Device component use); MOA (Modifier or additive use); TEM (Technical or engineered material use); USES (Uses)  
(elec. conductivity enhancer; films with good flexibility and low thickness containing polymer binders and **plasticizers** for battery components)
- IT Battery anodes  
Battery **cathodes**  
**Plasticizers**  
Secondary batteries  
Semiconductor materials  
(films with good flexibility and low thickness containing polymer binders and **plasticizers** for battery components)
- IT Polymers, uses  
RL: DEV (Device component use); MOA (Modifier or additive use); TEM (Technical or engineered material use); USES (Uses)  
(films with good flexibility and low thickness containing polymer binders and **plasticizers** for battery components)
- IT Iodides, uses  
Nitrides  
Oxides (inorganic), uses  
Sulfides, uses  
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
(films with good flexibility and low thickness containing polymer binders and **plasticizers** for battery components)
- IT Metals, uses  
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
(lithium alloyable; films with good flexibility and low thickness containing polymer binders and **plasticizers** for battery components)
- IT 7782-42-5, Graphite, uses  
RL: DEV (Device component use); MOA (Modifier or additive use); TEM (Technical or engineered material use); USES (Uses)  
(elec. conductivity enhancer; films with good flexibility and low thickness containing polymer binders and **plasticizers** for battery components)
- IT 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer  
RL: DEV (Device component use); MOA (Modifier or additive use); TEM (Technical or engineered material use); USES (Uses)  
(films with good flexibility and low thickness containing polymer binders and **plasticizers** for battery components)
- IT 1302-37-0, Spodumene 12031-95-7, Lithium titanate (Li<sub>4</sub>Ti<sub>5</sub>O<sub>12</sub>)  
12190-79-3, Lithium cobalt oxide (LiCoO<sub>2</sub>)  
RL: DEV (Device component use); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)  
(films with good flexibility and low thickness containing polymer binders and **plasticizers** for battery components)
- IT 1302-66-5, Petalite 12036-22-5, Tungsten dioxide 12039-13-3, Titanium disulfide 13463-67-7, Titanium oxide, uses 18868-43-4, Molybdenum dioxide 19497-94-0,  $\beta$ -Eucryptite 39300-70-4, Lithium nickel oxide 68136-21-0, Manganese nickel oxide  
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
(films with good flexibility and low thickness containing polymer binders and **plasticizers** for battery components)
- IT 67-68-5, Dimethyl sulfoxide, uses 96-48-0,  $\gamma$ -Butyrolactone

96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate  
 108-32-7, Propylene carbonate 109-99-9, THF, uses 616-38-6,  
 Dimethyl carbonate 623-53-0, Ethyl methyl carbonate 646-06-0,  
 Dioxolane 3741-38-6, Ethylene sulfite 56525-42-9, Methyl propyl  
 carbonate

RL: DEV (Device component use); MOA (Modifier or additive use); TEM  
 (Technical or engineered material use); USES (Uses)

(**plasticizer**; films with good flexibility and low  
 thickness containing polymer binders and **plasticizers** for  
 battery components)

REFERENCE COUNT: 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR  
 THIS RECORD. ALL CITATIONS AVAILABLE IN  
 THE RE FORMAT

L49 ANSWER 11 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2001:210247 HCAPLUS Full-text

DOCUMENT NUMBER: 134:225103

TITLE: Secondary lithium batteries and their  
 manufacture

INVENTOR(S): Park, Chi Gyun; Kakirde, Archana; Riu, Pey Kan;  
 Manivannan, Venkatesan; Chyai, Chul; Im, Dong  
 Joon; Lee, Jae Ha

PATENT ASSIGNEE(S): SKC Co., Ltd., S. Korea

SOURCE: Jpn. Kokai Tokkyo Koho, 12 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

| PATENT NO.             | KIND | DATE     | APPLICATION NO. | DATE              |
|------------------------|------|----------|-----------------|-------------------|
| -----                  | ---- | -----    | -----           |                   |
| JP 2001076758          | A    | 20010323 | JP 2000-238413  | 200008<br>07      |
| KR 2001016919          | A    | 20010305 | KR 1999-32141   | 199908<br>05      |
| PRIORITY APPLN. INFO.: |      |          | KR 1999-32141   | A<br>199908<br>05 |

AB The batteries have a polymer electrolyte between a **cathode** and an anode, where the electrolyte and/or the active mass for the **cathode** and/or for the anode contain poly(vinylidene fluoride), hexafluoropropylene-vinylidene fluoride copolymer containing 0-8% hexafluoropropylene, a **mixture** of the 2 polymers, or a **mixture** of the copolymer and a hexafluoropropylene-vinylidene fluoride copolymer containing 0-15% vinylidene fluoride. The batteries are prepared by applying an anode active mass on an anode collector, applying a polymer electrolyte to both side of the anode, applying a **cathode** active mass on a **cathode** collector, attaching the **cathode** to the electrolyte coated anode, removing **plasticizer** from the electrode-electrolyte stack, and injecting an electrolyte solution; where the electrode active mass and the polymer electrolyte contain a solvent selected from N-Me pyrrolidone, DMF, and ketones.

IT 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer  
 12190-79-3, Cobalt lithium oxide (CoLiO<sub>2</sub>)

RL: DEV (Device component use); PEP (Physical, engineering or  
 chemical process); PROC (Process); USES (Uses)

(fluoropolymer binders in manufacture of secondary polymer electrolyte lithium batteries)

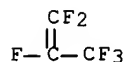
RN 9011-17-0 HCAPLUS

CN 1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with 1,1-difluoroethene  
(CA INDEX NAME)

CM 1

CRN 116-15-4

CMF C3 F6



CM 2

CRN 75-38-7

CMF C2 H2 F2



RN 12190-79-3 HCAPLUS

CN Cobalt lithium oxide (CoLiO<sub>2</sub>) (CA INDEX NAME)

| Component | Ratio | Component<br>Registry Number |
|-----------|-------|------------------------------|
| O         | 2     | 17778-80-2                   |
| Co        | 1     | 7440-48-4                    |
| Li        | 1     | 7439-93-2                    |

IC ICM H01M010-40

ICS H01M004-02; H01M004-62

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

IT 7440-44-0, Carbon, uses 9011-17-0,

Hexafluoropropylene-vinylidene fluoride copolymer 12190-79-3  
, Cobalt lithium oxide (CoLiO<sub>2</sub>) 24937-79-9, Poly(vinylidene fluoride)

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)

(fluoropolymer binders in manufacture of secondary polymer electrolyte lithium batteries)

L49 ANSWER 12 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2001:179635 HCAPLUS Full-text

DOCUMENT NUMBER: 134:210518

TITLE: Process for large scale fabrication of lithium polymer batteries with solid electrolytes in the film technology

INVENTOR(S): Meislitzer, Karl Heinz

PATENT ASSIGNEE(S): Bangert, Wolfgang, Germany; Sebastian, Rudolf

SOURCE: Ger. Offen., 12 pp.



DOCUMENT TYPE: CODEN: GWXXBX  
 LANGUAGE: Patent  
 German  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

| PATENT NO.             | KIND | DATE     | APPLICATION NO.  | DATE     |
|------------------------|------|----------|------------------|----------|
| DE 19941861            | A1   | 20010315 | DE 1999-19941861 | 19990902 |
| PRIORITY APPLN. INFO.: |      |          |                  | 19990902 |

AB Films for **cathodes** and anodes as well as for the electrolytes are pulled from pastes of suitable **composition** and preparation **Cathode** pastes are prepared from: 3-10% polymer or copolymer, PEO, polystyrene, polyvinyl chloride. polyvinylidene fluoride, or polyvinylidene fluoride-hexafluoropropylene copolymer (PVDF-HFP); 4-12% **plasticizer** (e.g., dibutylphthalate or dioctyl phthalate); 20-60 g% intercalation material (e.g., LiCoO<sub>2</sub>, LiNiO<sub>2</sub>, LiCo<sub>x</sub>Ni<sub>1-x</sub>O<sub>2</sub>, LiMn<sub>2</sub>O<sub>4</sub> or VO<sub>x</sub>); 2-10% elec. conductor (e.g., graphite powder or amorphous C); and 40-80% solvent (e.g., acetone). Anode paste comprises: 3-10% polymer or copolymer (e.g., PEO, polystyrene, PVC, PVDF, or PVDF-HFP copolymer), 4-12% **plasticizer** (di-Bu phthalate or dioctyl phthalate), 20-40% elec. conductor (graphite powder or amorphous C), and 40-80% solvent (acetone). The electrolyte paste comprises: 3-10 g% polymer or copolymer (PEO, polystyrene, PVC, PVDF or hexafluoropropylene-vinylidene fluoride copolymer), 4-12% **plasticizer** (DBP or DOP), 20-40% ionic conductor (Li<sub>9</sub>AlSiO<sub>8</sub>, Li<sub>1.3</sub>Al<sub>0.3</sub>Ti<sub>1.7</sub>(PO<sub>4</sub>)<sub>3</sub>, LiTi<sub>2</sub>(PO<sub>4</sub>)<sub>3</sub>, Li<sub>2</sub>O or Li<sub>4</sub>SiO<sub>4</sub>.Li<sub>3</sub>PO<sub>4</sub>), 2-10% ionic conductor (LiClO<sub>4</sub>, LiBF<sub>4</sub>, LiCl, LiBr, or LiI) and 40-80 g% solvent (acetone).

IT 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer  
 12190-79-3, Cobalt lithium oxide colio2  
 RL: DEV (Device component use); USES (Uses)  
 (process for large scale fabrication of lithium polymer batteries with solid electrolytes in film technol.)

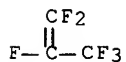
RN 9011-17-0 HCAPLUS

CN 1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with 1,1-difluoroethene (CA INDEX NAME)

CM 1

CRN 116-15-4

CMF C3 F6



CM 2

CRN 75-38-7

CMF C2 H2 F2



RN 12190-79-3 HCAPLUS  
 CN Cobalt lithium oxide (CoLiO2) (CA INDEX NAME)

| Component | Ratio | Component<br>Registry Number |
|-----------|-------|------------------------------|
| =====     | ===== | =====                        |
| O         | 2     | 17778-80-2                   |
| Co        | 1     | 7440-48-4                    |
| Li        | 1     | 7439-93-2                    |

IC ICM H01M004-04  
 ICS H01M004-62; H01M004-48  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 38  
 IT Battery anodes  
 Battery **cathodes**  
 Films  
 (process for large scale fabrication of lithium polymer batteries  
 with solid electrolytes in film technol.)  
 IT 7440-44-0, **Carbon**, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (amorphous; process for large scale fabrication of lithium  
 polymer batteries with solid electrolytes in film technol.)  
 IT 84-74-2, Dibutyl phthalate 117-84-0, Dioctyl phthalate  
 RL: DEV (Device component use); USES (Uses)  
 (**plasticizer**; process for large scale fabrication of  
 lithium polymer batteries with solid electrolytes in film  
 technol.)  
 IT 9002-86-2, Polyvinyl chloride 9003-53-6, Polystyrene  
**9011-17-0**, Hexafluoropropylene-vinylidene fluoride copolymer  
 11099-11-9, Vanadium oxide 12031-65-1, Lithium nickel oxide linio2  
 12057-17-9, Lithium manganese oxide limn2o4 **12190-79-3**,  
 Cobalt lithium oxide colio2 24937-79-9, Polyvinylidene fluoride  
 25322-68-3, Peo 131344-56-4, Cobalt lithium nickel oxide  
 RL: DEV (Device component use); USES (Uses)  
 (process for large scale fabrication of lithium polymer batteries  
 with solid electrolytes in film technol.)  
 REFERENCE COUNT: 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR  
 THIS RECORD. ALL CITATIONS AVAILABLE IN  
 THE RE FORMAT

L49 ANSWER 13 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN  
 ACCESSION NUMBER: 2000:441552 HCAPLUS Full-text  
 DOCUMENT NUMBER: 133:46201  
 TITLE: Method of fabrication of solid state polymer  
 batteries  
 INVENTOR(S): Muraoka, Hiroki; Kinoshita, Kazushige; Ohata,  
 Tsumoru; Shimizu, Kyoushige  
 PATENT ASSIGNEE(S): Matsushita Electric Industrial Co., Ltd., Japan  
 SOURCE: Eur. Pat. Appl., 14 pp.  
 CODEN: EPXXDW  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

| PATENT NO.  | KIND | DATE     | APPLICATION NO. | DATE       |
|---|------|----------|-----------------|------------|
| EP 1014466  | A1   | 20000628 | EP 1999-103670  | 19990225   |
| EP 1014466  | B1   | 20031008 |                 |            |
| R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO |      |          |                 |            |
| JP 2000195501   | A    | 20000714 | JP 1998-368907  | 19981225   |
| CA 2263080  | C    | 20040810 | CA 1999-2263080 | 19990226   |
| KR 2000047375   | A    | 20000725 | KR 1999-8265    | 19990312   |
| CN 1258938  | A    | 20000705 | CN 1999-104534  | 19990331   |
| PRIORITY APPLN. INFO.:  |      |          | JP 1998-368907  | A 19981225 |

AB A thin perforated collector is disposed in flushed state on the outer end surface of the **cathode** active material layer or the collector is embedded in the **cathode** active material layer so that the bottom plane facing the anode is present at the position of 2/3 to 4/5 of the total thickness of the layer from the side facing the anode. The collector of the **cathode** is prevented from peeling off from the **cathode** active material and besides the utilization ratio of the **cathode** active material is enhanced.

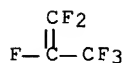
IT 12190-79-3, Cobalt lithium oxide colio2  
 RL: DEV (Device component use); USES (Uses)  
 (method of fabrication of solid state polymer batteries)  
 RN 12190-79-3 HCAPLUS  
 CN Cobalt lithium oxide (CoLiO2) (CA INDEX NAME)

| Component | Ratio | Component<br>Registry Number |
|-----------|-------|------------------------------|
| O         | 2     | 17778-80-2                   |
| Co        | 1     | 7440-48-4                    |
| Li        | 1     | 7439-93-2                    |

IT 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (method of fabrication of solid state polymer batteries)  
 RN 9011-17-0 HCAPLUS  
 CN 1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with 1,1-difluoroethene  
 (CA INDEX NAME)

CM 1

CRN 116-15-4  
 CMF C3 F6



CM 2

CRN 75-38-7  
CMF C2 H2 F2



IC ICM H01M010-40  
ICS H01M004-02; H01M010-04  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
IT Battery **cathodes**  
(method of fabrication of solid state polymer batteries)  
IT **Carbon** black, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(method of fabrication of solid state polymer batteries)  
IT 7429-90-5, Aluminum, uses 7440-44-0, **Carbon**, uses  
7440-50-8, Copper, uses 12190-79-3, Cobalt lithium oxide  
colio2  
RL: DEV (Device component use); USES (Uses)  
(method of fabrication of solid state polymer batteries)  
IT 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer  
RL: TEM (Technical or engineered material use); USES (Uses)  
(method of fabrication of solid state polymer batteries)  
IT 84-74-2, Dibutyl phthalate  
RL: TEM (Technical or engineered material use); USES (Uses)  
(**plasticizer**; method of fabrication of solid state  
polymer batteries)  
REFERENCE COUNT: 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR  
THIS RECORD. ALL CITATIONS AVAILABLE IN  
THE RE FORMAT

L49 ANSWER 14 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN  
ACCESSION NUMBER: 2000:191396 HCAPLUS Full-text  
DOCUMENT NUMBER: 132:224815  
TITLE: Manufacturing method for solid polymer alloy  
electrolyte in homogeneous state for  
**composite** electrode, lithium polymer  
battery and lithium ion polymer battery  
INVENTOR(S): Yun, Kyung Suk; Cho, Byung Won; Cho, Won Il;  
Paik, Chi Hum; Kim, Hyung Sun; Kim, Un Sek  
PATENT ASSIGNEE(S): Korea Institute of Science and Technology, S.  
Korea  
SOURCE: PCT Int. Appl., 54 pp.  
CODEN: PIXXD2  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

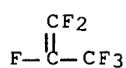
| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------------|------|------|-----------------|------|
|------------|------|------|-----------------|------|

|   |       |          |                |                   |
|---|-------|----------|----------------|-------------------|
| -----   | ----- | -----    | -----          |                   |
| WO 2000016421   | A1    | 20000323 | WO 1998-KR494  | 199812<br>31      |
| W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ,<br>DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, KE,<br>KG, KP, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW,<br>MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM,<br>TR, TT, UA, UG, UZ, VN, YU, ZW<br>RW: GH, GM, KE, LS, MW, SD, SZ, UG, ZW, AT, BE, CH, CY, DE, DK,<br>ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF,<br>CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG |       |          |                |                   |
| KR 2000019372   | A     | 20000406 | KR 1998-37423  | 199809<br>10      |
| AU 9916951  | A     | 20000403 | AU 1999-16951  | 199812<br>31      |
| EP 1114481  | A1    | 20010711 | EP 1998-961686 | 199812<br>31      |
| EP 1114481  | B1    | 20070801 |                |                   |
| R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC,<br>PT, IE, FI, CY  |       |          |                |                   |
| AT 368944   | T     | 20070815 | AT 1998-961686 | 199812<br>31      |
| US 6355380  | B1    | 20020312 | US 1999-231442 | 199901<br>14      |
| JP 2000090728   | A     | 20000331 | JP 1999-46527  | 199902<br>24      |
| JP 3085532  | B2    | 20000911 |                |                   |
| PRIORITY APPLN. INFO.:  |       |          | KR 1998-37423  | A<br>199809<br>10 |
|   |       |          | WO 1998-KR494  | W<br>199812<br>31 |

AB A homogeneous solid polymer alloy electrolyte comprises a total 100 weight% of **mixture** of (a) function-I polymers in an amount of 5-90 weight% comprising one of polyacrylonitrile-based (PAN-based) solid polymers and poly(Me methacrylate)-based (PMMA-based) solid polymers which have superior adhesion and ion conductivity, (b) function-II polymers in an amount of 5-80 weight% comprising one of poly(vinylidene fluoride)-based (PVdF-based) solid polymers and the PMMA-based solid polymers which have superior compatibility with an organic solvent electrolyte, (c) function-III polymers in an amount of 5-80 weight% comprising one of poly(vinyl chloride)-based (PVC-based) solid polymers and the PVdF-based solid polymers which have superior mech. strength. The solid polymer alloy electrolyte has superior ion conductivity, compatibility with an organic solvent and mech. strength, and a lithium polymer battery and a lithium polymer battery manufactured by making the **composite** anode and **cathode** using the solid polymer alloy electrolyte, and stacking the solid polymer alloy electrolyte and the **composite** anode (**cathode**) in several times, has excellent adhesion, mech. stability, low/high

temperature characteristics, high rate discharge, charge/discharge properties, and battery capacity and battery cycle life characteristics.

IT 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer  
 RL: DEV (Device component use); USES (Uses)  
 (manufacturing method for solid polymer alloy electrolyte in homogeneous state for **composite** electrode, lithium polymer battery and lithium ion polymer battery)  
 RN 9011-17-0 HCAPLUS  
 CN 1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with 1,1-difluoroethene (CA INDEX NAME)  
 CM 1  
 CRN 116-15-4  
 CMF C3 F6



CM 2  
 CRN 75-38-7  
 CMF C2 H2 F2



IT 12190-79-3, Cobalt lithium oxide colio2  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (manufacturing method for solid polymer alloy electrolyte in homogeneous state for **composite** electrode, lithium polymer battery and lithium ion polymer battery)  
 RN 12190-79-3 HCAPLUS  
 CN Cobalt lithium oxide (CoLiO2) (CA INDEX NAME)

| Component | Ratio | Component<br>Registry Number |
|-----------|-------|------------------------------|
| O         | 2     | 17778-80-2                   |
| Co        | 1     | 7440-48-4                    |
| Li        | 1     | 7439-93-2                    |

IC ICM H01M006-18  
 ICS H01M006-22; H01M010-40  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 38  
 IT Coke  
 RL: DEV (Device component use); USES (Uses)  
 (anode; manufacturing method for solid polymer alloy electrolyte in homogeneous state for **composite** electrode, lithium polymer battery and lithium ion polymer battery)  
 IT Secondary batteries  
 (lithium; manufacturing method for solid polymer alloy electrolyte in

- homogeneous state for **composite** electrode, lithium polymer battery and lithium ion polymer battery)
- IT Battery **cathodes**  
 Battery electrolytes  
**Plasticizers**  
 Polymer electrolytes  
 (manufacturing method for solid polymer alloy electrolyte in homogeneous state for **composite** electrode, lithium polymer battery and lithium ion polymer battery)
- IT Fluoropolymers, uses  
 RL: DEV (Device component use); USES (Uses)  
 (manufacturing method for solid polymer alloy electrolyte in homogeneous state for **composite** electrode, lithium polymer battery and lithium ion polymer battery)
- IT **Carbon** black, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (manufacturing method for solid polymer alloy electrolyte in homogeneous state for **composite** electrode, lithium polymer battery and lithium ion polymer battery)
- IT Lithium alloy, base  
 RL: DEV (Device component use); USES (Uses)  
 (anode; manufacturing method for solid polymer alloy electrolyte in homogeneous state for **composite** electrode, lithium polymer battery and lithium ion polymer battery)
- IT 1332-29-2, Tin oxide 7440-44-0, **Carbon**, uses  
 7782-42-5, Graphite, uses 39448-96-9, Graphite lithium  
 160479-36-7, Lithium tin oxide  
 RL: DEV (Device component use); USES (Uses)  
 (anode; manufacturing method for solid polymer alloy electrolyte in homogeneous state for **composite** electrode, lithium polymer battery and lithium ion polymer battery)
- IT 105-37-3, Ethyl propionate 141-78-6, Acetic acid ethyl ester, uses  
 1344-28-1, Alumina, uses 7439-93-2, Lithium, uses 7631-86-9,  
 Silica, uses 9010-76-8, Acrylonitrile-vinylidene chloride  
 copolymer 9010-88-2, Ethyl acrylate-methyl methacrylate copolymer  
 9011-14-7, Pmma 9011-17-0, Hexafluoropropylene-vinylidene  
 fluoride copolymer 21324-40-3, Lithium hexafluorophosphate  
 24937-79-9, Polyvinylidene fluoride 24968-79-4,  
 Acrylonitrile-methyl acrylate copolymer 25014-41-9,  
 Polyacrylonitrile  
 RL: DEV (Device component use); USES (Uses)  
 (manufacturing method for solid polymer alloy electrolyte in homogeneous state for **composite** electrode, lithium polymer battery and lithium ion polymer battery)
- IT 1314-62-1, Vanadium pentoxide, uses 12031-65-1, Lithium nickel  
 oxide linio2 12037-42-2, Vanadium oxide v6o13 12057-17-9,  
 Lithium manganese oxide limn2o4 12190-79-3, Cobalt lithium  
 oxide colio2  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (manufacturing method for solid polymer alloy electrolyte in homogeneous state for **composite** electrode, lithium polymer battery and lithium ion polymer battery)
- IT 68-12-2, Dmf, uses 75-05-8, Acetonitrile, uses 96-49-1, Ethylene  
 carbonate 108-32-7, Propylene carbonate 127-19-5, Dimethyl  
 acetamide 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl  
 carbonate  
 RL: DEV (Device component use); USES (Uses)  
 (**plasticizer**; manufacturing method for solid polymer alloy electrolyte in homogeneous state for **composite** electrode, lithium polymer battery and lithium ion polymer

battery)  
 IT 79-20-9, Methyl acetate 105-58-8 554-12-1, Methyl propionate  
 RL: DEV (Device component use); USES (Uses)  
 (solvent; manufacturing method for solid polymer alloy electrolyte in  
 homogeneous state for **composite** electrode, lithium  
 polymer battery and lithium ion polymer battery)  
 REFERENCE COUNT: 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR  
 THIS RECORD. ALL CITATIONS AVAILABLE IN  
 THE RE FORMAT

L49 ANSWER 15 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN  
 ACCESSION NUMBER: 2000:182853 HCAPLUS Full-text  
 DOCUMENT NUMBER: 132:210247  
 TITLE: Polymer films and their manufacture for lithium  
 ion batteries  
 INVENTOR(S): Iyen, Hsiao Pin Elizabeth  
 PATENT ASSIGNEE(S): Nexcell Battery Co., Ltd., Taiwan; Electrochem  
 Automation Inc.  
 SOURCE: Jpn. Kokai Tokkyo Koho, 16 pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

| PATENT NO.             | KIND | DATE     | APPLICATION NO.  | DATE              |
|------------------------|------|----------|------------------|-------------------|
| -----                  | ---- | -----    | -----            |                   |
| JP 2000080176          | A    | 20000321 | JP 1999-256099   | 199908<br>07      |
| TW 385564              | B    | 20000321 | TW 1998-87113266 | 199808<br>12      |
| PRIORITY APPLN. INFO.: |      |          | TW 1998-87113266 | A<br>199808<br>12 |

AB The films are manufactured by heating copolymers (e.g., PVDF copolymers) with  
 solvents, vigorously stirring the solns. with **mixts.** containing amyl acetate,  
 BuOH, and fillers, and forming films from the resulting viscous materials.  
 The films may be attached to **cathodes** or anodes, or used as separators in Li+  
 batteries. The polymer films are formed without using **plasticizers** and provide  
 batteries with good cycle stability.

IT 12190-79-3, Cobalt lithium oxide (CoLiO2)  
 RL: DEV (Device component use); USES (Uses)  
 (**cathode** material; manufacture of fluoropolymer films for  
 lithium ion batteries)  
 RN 12190-79-3 HCAPLUS  
 CN Cobalt lithium oxide (CoLiO2) (CA INDEX NAME)

| Component | Ratio | Component<br>Registry Number |
|-----------|-------|------------------------------|
| =====     | ===== | =====                        |
| O         | 2     | 17778-80-2                   |
| Co        | 1     | 7440-48-4                    |
| Li        | 1     | 7439-93-2                    |

IT 9011-17-0, Kynar 2822  
 RL: DEV (Device component use); PEP (Physical, engineering or



chemical process); PROC (Process); USES (Uses)  
(manufacture of fluoropolymer films for lithium ion batteries)

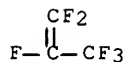
RN 9011-17-0 HCAPLUS

CN 1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with 1,1-difluoroethene  
(CA INDEX NAME)

CM 1

CRN 116-15-4

CMF C3 F6



CM 2

CRN 75-38-7

CMF C2 H2 F2



IC ICM C08J005-18

ICS H01M002-16; H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38

IT **Carbon** black, uses

RL: DEV (Device component use); USES (Uses)  
(**cathode** or anode material; manufacture of fluoropolymer  
films for lithium ion batteries)

IT Battery anodes

Battery **cathodes**

Plastic films

Secondary battery separators

(manufacture of fluoropolymer films for lithium ion batteries)

IT 12190-79-3, Cobalt lithium oxide (CoLiO<sub>2</sub>) 66554-04-9,

Lithium magnesium oxide 187144-48-5, Cobalt lithium magnesium  
oxide

RL: DEV (Device component use); USES (Uses)

(**cathode** material; manufacture of fluoropolymer films for  
lithium ion batteries)

IT 9011-17-0, Kynar 2822

RL: DEV (Device component use); PEP (Physical, engineering or  
chemical process); PROC (Process); USES (Uses)

(manufacture of fluoropolymer films for lithium ion batteries)

L49 ANSWER 16 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1999:690285 HCAPLUS Full-text

DOCUMENT NUMBER: 131:288891

TITLE: Electrodes for secondary polymer electrolyte  
batteries and manufacture of the batteries

INVENTOR(S): Kurisu, Shunji; Kimishima, Takahiro

PATENT ASSIGNEE(S): Toshiba Battery Co., Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 8 pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

| PATENT NO.  | KIND | DATE     | APPLICATION NO. | DATE     |
|-------------|------|----------|-----------------|----------|
| JP 11297312 | A    | 19991029 | JP 1998-95835   | 19980408 |

PRIORITY APPLN. INFO.: JP 1998-95835  
 19980408

AB The electrodes have an electrolyte free paste layer, having a d. ≥90% of the theor. d., on a collector. The batteries are prepared by applying an electrolyte free paste on collector, heating the pasted collector, and pressing to form **cathodes** and/or anodes. Preferably, the paste contains hexafluoropropylene- vinylidene fluoride copolymers and **plasticizers**.

IT 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer

12190-79-3, Cobalt lithium oxide (CoLiO<sub>2</sub>)

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)

(controlled d. of active mass paste layers for electrodes in manufacture of secondary polymer batteries)

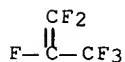
RN 9011-17-0 HCAPLUS

CN 1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with 1,1-difluoroethene (CA INDEX NAME)

CM 1

CRN 116-15-4

CMF C3 F6



CM 2

CRN 75-38-7

CMF C2 H2 F2



RN 12190-79-3 HCAPLUS

CN Cobalt lithium oxide (CoLiO<sub>2</sub>) (CA INDEX NAME)

| Component | Ratio | Component |
|-----------|-------|-----------|
|-----------|-------|-----------|

|    |   | Registry Number |
|----|---|-----------------|
| O  | 2 | 17778-80-2      |
| Co | 1 | 7440-48-4       |
| Li | 1 | 7439-93-2       |

IC ICM H01M004-04  
ICS H01M004-62; H01M010-40  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
IT **Carbon** black, uses  
**Carbon** fibers, uses  
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
(controlled d. of active mass paste layers for electrodes in manufacture of secondary polymer batteries)  
IT 84-74-2, Dbp 9011-17-0; Hexafluoropropylene-vinylidene fluoride copolymer 12190-79-3, Cobalt lithium oxide (CoLiO<sub>2</sub>)  
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
(controlled d. of active mass paste layers for electrodes in manufacture of secondary polymer batteries)

L49 ANSWER 17 OF 17 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1999:653386 HCAPLUS Full-text

DOCUMENT NUMBER: 131:259964

TITLE: **Compositions** and methods for production of lithium secondary batteries using epoxidized soybean oil **plasticizers**

INVENTOR(S): Roh, Whan-Jin

PATENT ASSIGNEE(S): Samsung Display Devices Co., Ltd., S. Korea

SOURCE: Ger. Offen., 8 pp.

CODEN: GWXXBX

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

| PATENT NO.             | KIND | DATE     | APPLICATION NO.  | DATE       |
|------------------------|------|----------|------------------|------------|
| -----                  | ---- | -----    | -----            |            |
| DE 19915394            | A1   | 19991007 | DE 1999-19915394 | 19990406   |
| GB 2336239             | A    | 19991013 | GB 1999-7842     | 19990406   |
| JP 11329412            | A    | 19991130 | JP 1999-98255    | 19990406   |
| JP 3928167             | B2   | 20070613 |                  |            |
| PRIORITY APPLN. INFO.: |      |          | KR 1998-12036    | A 19980406 |

OTHER SOURCE(S): MARPAT 131:259964

AB Battery electrodes for lithium secondary batteries are manufactured from active films laminated with current collectors (Al, Cu foils), using electrode active materials (LiCoO<sub>2</sub>, LiMn<sub>2</sub>O<sub>4</sub>, graphite), elec. conductors (**carbon** black),

binders (PVDF), and **plasticizers**, where the **plasticizer** is an epoxidized soybean oil.

IT 12190-79-3, Cobalt lithium oxide (CoLiO<sub>2</sub>)  
 RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
 (cathodes; epoxidized soybean oil **plasticizers** for production of lithium secondary battery)  
 RN 12190-79-3 HCAPLUS  
 CN Cobalt lithium oxide (CoLiO<sub>2</sub>) (CA INDEX NAME)

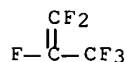
| Component | Ratio | Component Registry Number |
|-----------|-------|---------------------------|
| O         | 2     | 17778-80-2                |
| Co        | 1     | 7440-48-4                 |
| Li        | 1     | 7439-93-2                 |

IT 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer  
 RL: DEV (Device component use); NUU (Other use, unclassified); USES (Uses)  
 (separators; epoxidized soybean oil **plasticizers** for production of lithium secondary battery)  
 RN 9011-17-0 HCAPLUS  
 CN 1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with 1,1-difluoroethene (CA INDEX NAME)

CM 1

CRN 116-15-4

CMF C3 F6



CM 2

CRN 75-38-7

CMF C2 H2 F2



IC ICM H01M004-62  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 37  
 ST lithium secondary battery epoxidized soybean oil **plasticizer**  
 IT Fluoropolymers, uses  
 RL: DEV (Device component use); NUU (Other use, unclassified); USES (Uses)  
 (binders; epoxidized soybean oil **plasticizers** for production of lithium secondary battery)  
 IT Battery anodes  
 Battery **cathodes**

**Plasticizers**

(epoxidized soybean oil **plasticizers** for production of lithium secondary battery)

IT **Carbon black, uses**

RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)

(epoxidized soybean oil **plasticizers** for production of lithium secondary battery)

IT **Soybean oil**

RL: NUU (Other use, unclassified); USES (Uses)

(epoxidized, **plasticizers**; epoxidized soybean oil **plasticizers** for production of lithium secondary battery)

IT **Secondary batteries**

(lithium; epoxidized soybean oil **plasticizers** for production of lithium secondary battery)

IT **Glycerides, uses**

RL: NUU (Other use, unclassified); USES (Uses)

(soya, epoxidized, **plasticizers**; epoxidized soybean oil **plasticizers** for production of lithium secondary battery)

IT **7782-42-5, Graphite, uses**

RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)

(anodes; epoxidized soybean oil **plasticizers** for production of lithium secondary battery)

IT **24937-79-9**

RL: DEV (Device component use); NUU (Other use, unclassified); USES (Uses)

(binders; epoxidized soybean oil **plasticizers** for production of lithium secondary battery)

IT **12057-17-9, Lithium manganese oxide (LiMn2O4) 12190-79-3, Cobalt lithium oxide (CoLiO2)**

RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)

(**cathodes**; epoxidized soybean oil **plasticizers** for production of lithium secondary battery)

IT **21324-40-3, Lithium hexafluorophosphate**

RL: NUU (Other use, unclassified); USES (Uses)

(electrolyte; epoxidized soybean oil **plasticizers** for production of lithium secondary battery)

IT **7429-90-5, Aluminum, uses 7440-50-8, Copper, uses**

RL: DEV (Device component use); USES (Uses)

(foil; grid; epoxidized soybean oil **plasticizers** for production of lithium secondary battery)

IT **9002-88-4, Polyethylene**

RL: DEV (Device component use); USES (Uses)

(sealing materials; epoxidized soybean oil **plasticizers** for production of lithium secondary battery)

IT **9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer**

RL: DEV (Device component use); NUU (Other use, unclassified); USES (Uses)

(separators; epoxidized soybean oil **plasticizers** for production of lithium secondary battery)

IT **96-49-1, Ethylene carbonate 616-38-6, Dimethylcarbonate 872-50-4, N-Methylpyrrolidone, uses**

RL: NUU (Other use, unclassified); USES (Uses)

(solvents; epoxidized soybean oil **plasticizers** for production of lithium secondary battery)